Purdue University Bulletin

Northwestern District

Michigan City Center

Announcements 1963-64

UNIVERSITY CALENDAR

1963

SEPTEMBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

OCTOBER

S	M	T	W	T	F	S
		1	2	3	4	5
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20	21	22	23	24	25	26
27	28	29	30	31		

NOVEMBER

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
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24	25	26	27	28	29	30

DECEMBER

S	M	T	W	T	F	S
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29	30	31				

1964

JANUARY

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

FEBRUARY

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

MARCH

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
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22	23	24	25	26	27	28
29	30	31				

APRIL

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			1	2	3	4
5	6	7	8	9	10	11
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26	27	28	29	30		

MAY

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24	25	26	27	28	29	30
31						

JUNE

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	1	2	3	4	5	6
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14	15	16	17	18	19	20
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28	29	30				

JULY

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
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26	27	28	29	30	31	

AUGUST

S	M	T	W	T	F	S
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9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

First Semester

September 9-10
Registration

September 11, noon
Classes begin

November 27, noon
Thanksgiving vacation begins

December 2, 7 a.m.
Classes resume

December 21, noon
Christmas vacation begins

January 6, 7 a.m.
Classes resume

January 18, noon
Classes end

Second Semester

January 23-24
Registration

January 27, noon
Classes begin

March 21, noon
Spring vacation begins

March 30, 7 a.m.
Classes resume

May 27, noon
Classes end

May 31
Commencement

Summer Sessions, 1964

June 11-12
Registration

June 15-August 7
Regular 8-Weeks Session

July 4
Independence Day Holiday

PURDUE UNIVERSITY BULLETIN

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Michigan City Center

NORTHWESTERN DISTRICT

Announcements for the Year 1963-64

PURDUE UNIVERSITY

Eighty-ninth Year

LAFAYETTE, INDIANA

PUBLISHED BY THE UNIVERSITY

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PURDUE UNIVERSITY

Division of University Centers

Lafayette, Indiana

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Barker Memorial Center (Michigan City) Administrative Staff

R. F. Schwarz, M.S.	Director

ADMISSION

All inquiries regarding admission to Purdue University as well as requests for application forms should be addressed to the Admissions Office of the campus or center at which the applicant wishes to enroll. The application should be filled out according to the instructions on the form and submitted to the high school from which the individual graduated. The high school will complete the application and forward it to the campus or center indicated by the student. Prospective students should make application during the seventh semester of high school. This enables the University to notify the applicants of tentative action before they graduate.

Acceptance for admission will depend upon three factors: subject matter requirements, class standing, and College Board Examination results.

1. Subject Matter Requirements. All areas of specialization at Purdue require one unit of algebra, one unit of plane geometry, one unit of laboratory science, three units of English, a unit of social studies, three additional units of one or more of these subjects mentioned; a total of not less than 15 units; and finally high school graduation. In addition, the Engineering Schools require one half unit of advanced algebra and one half unit of trigonometry. Physical Education for Men does not require units in algebra and plane geometry.
   High school students who desire to take engineering and who expect to get the degree in eight semesters under the regular engineering curriculum should obtain credit in the following high school subjects in addition to the minimum requirements listed above: a fourth semester of algebra and a full unit of both physics and chemistry.
2. Class Standing. Preference is given to applicants in the upper half of their high school graduating class. Students ranking in the lower

AREA	High-School Graduation	1 Unit Algebra	½ Unit Advanced Algebra	1 Unit Plane Geometry	½ Unit Trigonometry	1 Unit Laboratory Science	3 Units English	1 Unit Social Studies	3 More Units in Mathematics, Science, English and/or Social Studies	Total of Not Less Than 15 Units
Agriculture	x	x		x		x	x	x	x	x
Engineering	x	x	x	x	x	x	x	x	x	x
Home Economics	x	x		x		x	x	x	x	x
Science, Education and Humanities*	x	x		x		x	x	x	x	x
Physical Education (Men)	x					x	x	x	x	x
Applied Technology	x	x		x		x	x	x	x	x
Veterinary Medicine	Two years of preveterinary medicine curriculum									

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* Includes prepharmacy and pre-industrial management.

half of their graduating classes (lowest third if application is for agriculture or applied technology) will be considered as special cases. On the basis of examination results, high school record, and any other pertinent information, one of the following actions may be taken:

  a. Granted unqualified admission.
  b. Admitted on one semester probation.
  c. Admission postponed until an adequate academic background can be demonstrated.

3. College Entrance Examination Board Test: Out-of-state applicants are *required* to take both the SAT and the achievement sections of the College Board Test. Indiana applicants are *required* to take the SAT and *urged* to take the achievement section. Applicants for engineering, mathematics, and the physical sciences should take achievement tests in English, advanced mathematics, and physics or chemistry. Applicants to all other curricula should take achievement tests in English, intermediate mathematics, and physics or chemistry.

Nonresident Admission

Out-of-state applicants must rank in the top quarter (25%) of their graduating class or in the top quarter of the College Board Test to qualify for admission. Such applicants who are qualified will be considered in numbers consistent with the facilities of the University campus concerned. The individual campus or center reserves the right to alter admission requirements for this group as the situation requires.

Transfer Students

An applicant transferring from another college or university must fulfill the following requirements:

1. Submit an application for admission on the prescribed form through the high school from which he was graduated.
2. Forward an official transcript of work done in institutions previously attended.
3. Have earned an average of at least one letter grade higher than the passing grade for all courses previously taken at a recognized college or university.
4. Provide the completed application, including all items specified above, to the admissions officer not later than 15 days before the applicant's registration at Purdue.

Temporary Students

Persons who desire to take advantage of the instruction offered in any of the departments of the University without undertaking one of the regular plans of study and without becoming a candidate for a degree may be admitted as temporary students. Such students must present satisfactory evidence that they are prepared to undertake the work desired. Application for admission as a temporary student should be made to the Admissions Office of the campus or center involved. Temporary students are expected to maintain a grade-point average equivalent to regular students as outlined on pages 9, 10, and 11.

Placement Tests

All entering freshmen are required to take a battery of placement tests. These tests cover English, mathematics, science, and other academic fields. They are given for the purpose of placing the student in beginning courses at the level for which he is prepared by his previous training. The student who demonstrates exceptional strength on these tests may be permitted to omit certain beginning courses normally required of freshmen students. This will permit such students to elect other courses that will add strength to their program of study.

Registration

a. Preregistration—Current students should preregister for fall, spring, and summer sessions at announced times. New students should preregister at the times specified by the admissions officer. Preregistration eliminates standing in line and assures preferential scheduling.
b. For students who cannot preregister, a two-day registration period is held just prior to the beginning of classes. Consult the calendar on the inside front cover for dates.
c. Late registration lasts one week, from the first day of class.

Dropping and Adding Courses

A student may add a course to his schedule only during the first week of class. To drop a course he should consult the fee refund schedule on the next page and the directed grades explanation on page 9.

University Fees

Since catalog copy is, of necessity, prepared several months in advance, fees are subject to change by the Board of Trustees without notice.

Course Fees. For courses numbered 100-499, $15 per credit hour plus $4 per laboratory hour. For courses numbered 500 and above, $18 per credit hour plus $4 per laboratory hour. This fee schedule may not necessarily apply to special programs.

Late Registration Fees. In addition to the regular course fees, students who register late must pay $2 per course with a maximum of $10 and a minimum of $5 per student always to apply. This is currently effective at the Calumet Campus and Indianapolis Campus.

Breakage Fees. Course fees include the cost of normal breakage and wear and tear on equipment. An additional charge will be levied against individuals for excessive waste, loss, or breakage that may occur. Such special charges must be paid before course credit will be given.

Activity Fees. Students enrolled in 12 semester hours or more at the Calumet Campus, Indianapolis Campus, or Fort Wayne Center pay an activity fee of $3 per semester. At the Fort Wayne Center only, students carrying 8-11 semester hours pay a $2 activity fee and those carrying 1-7 hours pay $1 per semester.

Special Examination Fees. By any student taking an examination to remove a condition—per course	$ 5

For advanced credit for students who are currently registered for more than seven semester hours (four or more in a summer session)—per course . . . . $ 5

For advanced credit for students who are currently registered for seven hours or less (less than four in a summer session)—per course $25

Withdrawal. In order to effect a withdrawal from any class, a student must notify the campus or center office at the time of withdrawal. Discontinuance of class attendance is not the basis for withdrawal, and students who do not notify the office when they plan to withdraw will be given a failing grade in each course involved.

Refunds. Course fees will be refunded under any one of the following conditions:

1. Withdrawal during first and second weeks of semester, 80 per cent refund.
2. Withdrawal during third and fourth weeks of semester, 60 per cent refund.
3. Withdrawal during fifth and sixth weeks of semester, 40 per cent refund.
4. Withdrawal after sixth week of semester, no refund.
5. No refund in flight courses.

Students who register for a course and do not attend class will be withdrawn as of the first day of class and entitled to a refund of 80 per cent of the course fees paid.

Deposits on equipment are subject to regular service and breakage charges.

Refunds are not transferable from one registration period to another or from one student to another.

To be eligible for a refund the student must notify the extension office and apply for a refund at the center where he is registered at the time of his withdrawal.

Grades

Instructors will assign each student a grade for each course in which he is enrolled at the close of a session. The student shall be responsible for the completion of all required work by the time of the last scheduled meeting in the course unless his assignment to the course has been properly cancelled. The grade shall indicate the student's achievement with respect to the objectives of the course.

For credit courses:

A—highest passing grade.
B
C
D—lowest passing grade; passing minimal objectives of the course.
E—conditional failure; failure to achieve minimal objectives, but only to such limited extent that credit can be obtained by examination or otherwise without repeating the entire course. This grade represents failure in the course unless and until the record is duly changed within one semester. It cannot be changed to a grade higher than a D.
F—failure to achieve minimal objectives of the course. The student must repeat the course satisfactorily in order to establish credit in it.

For zero credit courses (including thesis research but not including laboratory portions of courses in which, for purposes of scheduling, separate course designations and separate class cards are used for the laboratory sections):

S—satisfactory; meets course objectives.

U—unsatisfactory; does not meet course objectives.

For incomplete work, either credit or noncredit:

O—incomplete; no grade; a temporary record of work which was interrupted by unavoidable absence or other causes beyond a student's control, and which work was passing at the time it was interrupted. An instructor may require the student to secure the recommendation of the dean of men or the dean of women that the circumstances warrant a grade of incomplete. On the record a grade of O will be equivalent to a W unless and until the record is duly changed within one semester.

Directed grades. The registrar is directed to record the following grades and symbols under special circumstances:

W—withdrew; a record of the fact that a student was enrolled in a course and withdrew or cancelled the course after the last date for late registration and adding courses.

WF—withdrew failing; a record of course cancellation after the last date for cancelling a course without grade, at which time, according to a statement from the instructor, the student was not passing in his work. This grade counts in all respects as a failing grade.

A grade of WF may be directed by the dean of men, the dean of women, or the Committee on Scholastic Delinquency and Readmission when a student is dropped from a course for serious scholastic delinquency.

Good Standing

For purposes of reports and communications to other institutions and agencies and in the absence of any further qualification of the term, a student shall be considered in good standing unless he has been dismissed, suspended, or dropped from the University and has not been readmitted.

SCHOLARSHIP INDEXES AND PROBATION STANDARDS

Scholarship Indexes

The scholastic standing of all regular students enrolled in programs leading to an undergraduate degree shall be determined by two scholarship indexes, the Semester Index and the Graduation Index.

(a) The Semester Index is an average determined by weighting each grade received during a given semester by the number of semester hours of credit in the course.

(b) The Graduation Index is a weighted average of all grades received by a student while in the curriculum in which he is enrolled plus all other grades received in courses taken in other curricula offered by the University and properly accepted for satisfying the requirements of the curriculum of the school in which the student is enrolled. With the consent of his adviser, a student may repeat a course. In the case of courses which have been repeated or in which conditional grades have been removed by examination or for which a substantially equivalent course has been substituted, the most recent grade received shall be used.

(c) For the purpose of averaging, each grade shall be weighted in the following manner:

A—6 x semester hours = index points
B—5 x semester hours = index points
C—4 x semester hours = index points
D—3 x semester hours = index points
E, F, WF 2 x semester hours = index points
O, W not included

Graduation Index Requirements

A minimum Graduation Index of 4.00 shall be required for graduation on and after September 1, 1965. Prior to September 1, 1965, the following schedule of minimum Graduation Indexes shall be required for graduation:

All students Graduating During	Minimum Graduation Index Required
Sept. 1, 1962-Aug. 31, 1963	3.85
Sept. 1, 1963-Aug. 31, 1964	3.90
Sept. 1, 1964-Aug. 31, 1965	3.95

Scholastic Probation

A candidate for the bachelor's degree shall be placed on probation if his semester or graduation index at the end of any semester is less than that required for a student with his classification as shown in Table A. A student on probation shall be removed from that status at the end of the first subsequent semester in which he achieves semester and graduation indexes equal to or greater than those required for a student with his classification as shown in Table A. Any grade change due to a reporting error will require reconsideration of probation status.

Temporary students who do not achieve academic standing required of regular students may be discontinued. Probation is concerned only with the regular semesters and not with the summer sessions, summer camps, and intensive courses.

TABLE A. INDEX LEVELS FOR PROBATION

S = Semester Index; G = Graduation Index

Year	Sept. 1, 1962 to Aug. 31, 1963		Sept. 1, 1963 to Aug. 31, 1964		Sept. 1, 1964 to Aug. 31, 1965		Sept. 1, 1965 and after	
Classification	S	G	S	G	S	G	S	G
1	3.4	3.4	3.4	3.4	3.5	3.5	3.5	3.5
2	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
3	3.5	3.65	3.6	3.7	3.6	3.75	3.6	3.75
4	3.5	3.75	3.6	3.8	3.6	3.85	3.6	3.90
5	3.7	3.8	3.7	3.85	3.7	3.90	3.7	3.95
6	3.7	3.85	3.7	3.9	3.7	3.95	3.7	4.0
7	3.7	3.85	3.7	3.9	3.7	3.95	3.7	4.0
8 and up	3.7	3.85	3.7	3.9	3.7	3.95	3.7	4.0

Dropping of Students for Scholastic Deficiency

A student on scholastic probation shall be dropped from the University if at the close of any semester the semester or graduation index is less than that required of a student with his classification as shown in Table B. This rule shall not apply for the semester in which the student completes all requirements for his degree. A student who has been dropped may petition the Faculty Committee on Scholastic Delinquencies and Readmissions for readmission. If he is permitted to register again, he will do so on probation.

TABLE B. INDEX LEVELS FOR DROPPING
S = Semester Index; G = Graduation Index

Year	Sept. 1, 1962 to Aug. 31, 1963		Sept. 1, 1963 to Aug. 31, 1964		Sept. 1, 1964 to Aug. 31, 1965		Sept. 1, 1965 and after	
Classification	S	G	S	G	S	G	S	G
1*	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2
2	3.2	3.3	3.3	3.3	3.3	3.3	3.3	3.3
3	3.4	3.4	3.4	3.5	3.4	3.5	3.4	3.5
4	3.4	3.5	3.4	3.55	3.4	3.6	3.4	3.6
5	3.5	3.55	3.5	3.65	3.5	3.7	3.5	3.7
6	3.5	3.65	3.5	3.7	3.5	3.75	3.5	3.8
7	3.5	3.70	3.5	3.75	3.5	3.80	3.5	3.85
8 and up	3.5	3.75	3.5	3.8	3.5	3.85	3.5	3.9

* Affects only students entering on probation.

Distinguished Students

Regular undergraduate students, carrying at least 14 semester hours, who successfully complete all their courses with a grade C or higher and obtain a semester scholarship index of 5.50 or better will be designated as distinguished for that semester.

Degrees with Distinction

Degrees are awarded at the end of each semester and summer session to candidates who have completed the requirements of their schools. At each of these periods degrees with distinction are awarded to those completing the undergraduate plans of study under the following rules:

(a) Distinction at graduation shall be awarded on the basis of all course work taken. Baccalaureate degrees with distinction shall be granted only to those who complete the four (or five) year curricula at Purdue and not to those who complete only the first three years at Purdue.

(b) A candidate for the baccalaureate degree with distinction must have earned at least seventy hours of credit at Purdue. A candidate for an associate degree with distinction must have earned at least forty-five hours of credit at Purdue.

For any student to qualify for distinction, his scholarship index for all work completed must be at least 5.00.

(c) If the number of graduates in any school who qualify for distinction under rules (a) and (b) exceeds one-tenth of the total number of graduates from that school and for that semester or summer session, the number of degrees with distinction shall be limited to one-tenth of the class in that school, and those graduates with highest indexes shall be included. In administering this rule all baccalaureate engineering graduates will be considered as one school and all associate degree graduates will be considered as one school.

(d) Of those students who qualify for distinction under these rules, the three-tenths of the baccalaureate graduates having the highest indexes shall be designated as graduating with highest distinction, irrespective of the schools to which they may belong. The three-tenths of the associate degree graduates having the highest indexes will be designated as graduating with highest distinction.

(e) No student with a record of faculty discipline shall be included without special approval by the faculty.

Recognition of High Scholastic Attainment

A faculty committee is charged with the duty of recognizing students of superior ability and of assisting such students to receive the greatest possible benefits from their college careers.

High scholastic attainment is recognized by citation for distinguished scholarship. Those placed on the list of distinguished students, published after the close of each semester, are entitled to special privileges as follows:

> Honor students of all classes are offered the opportunity to do work, for credit toward graduation, in addition to their regular schedule of studies. These additional assignments must have the approval of the head of the school involved. In order to make such additional work practicable the following special concessions may be granted:
>
> 1. Regular assignment of such additional subjects as the schedule will permit.
> 2. Assignments outside class under the supervision of an instructor.
> 3. Opportunities to gain credit in a subject by special examination.
> 4. Special arrangements as approved by the head of the school involved.
> 5. Some flexibility in the application of the system of prerequisites to these students.
>
> Detailed reports of special arrangements under numbers 2 and 4 above are to be filed by the instructor with the dean of the school involved, with a recommendation concerning the amount of credit to be granted.

Students who in the judgment of one or more faculty members merit citation for special distinguished achievement shall have their names presented through the heads of instructional departments or directly to the Committee on Students of Superior Ability, together with such evidence of achievement as is available. The criteria for selecting students in this group are: (a) original thinking of consistently good quality; (b) achievement other than class work—publication of literary, artistic, or scientific work; (c) work which requires great ingenuity or industry, but which may not lead to definite publication; and (d) independent projects of reasonable magnitude carried out by the student on his own initiative.

Projects carried out by such students may receive special achievement credit. Students in this group are not eligible for the special privileges listed above for distinguished students.

ABBREVIATIONS

A&D—Art and Design
AGR—Agriculture
AGRY—Agronomy
BC—Architectural Engineering Technology
BIO—Biological Sciences
CE—Civil Engineering
CES—Civil Engineering Service Courses
CHE—Chemical Engineering
CHM—Chemistry
CM—Chemical and Metallurgical Engineering Technology
CT—Civil Engineering Technology
DM—Mechanical Engineering Technology
ECON—Economics
EE—Electrical Engineering
ENGL—English
ENGR—Engineering
ESC—Engineering Sciences
ET—Electrical Engineering Technology
FOR—Forestry and Conservation
FR—French
GER—German
GN—Personal Service Courses (General Studies)
GS—General Studies
GVMT—Government
HIST—History
INDM—Industrial Management
IT—Industrial Engineerneering Technology
MA—Mathematics
ME—Mechanical Engineering
PEMN—Physical Education for Men
PEW—Physical Education for Women
PHAR—Pharmacy
PHCH—Pharmaceutical Chemistry
PHIL—Philosophy
PHYS—Physics
PS—Physical Sciences
PSY—Psychology
RUSS—Russian
SOC—Sociology
SPAN—Spanish
SPE—Speech
STAT—Statistics

SCHOOLS OF ENGINEERING AND DIVISION OF MATHEMATICAL SCIENCES

Undergraduate instruction in aeronautical engineering, agricultural engineering, chemical engineering, civil engineering, electrical engineering, engineering sciences, industrial engineering, mechanical engineering, and metallurgical engineering leads to the degree of Bachelor of Science. In order to give the student sufficient time to adjust himself and to choose the branch of engineering for which he is best adapted, the following program of study during the freshman year is common for all engineering curricula. Only those students with adequate background training will be expected to accomplish this in two semesters. Students with inadequate preparation, particularly in mathematics and chemistry, may require an additional semester or summer session to attain sophomore standing. Sophomore plans of study available in some of the fields of engineering are indicated. A degree of Bachelor of Science is awarded to the student who acceptably completes the program of study majoring in mathematics.

General Education Program

All engineering students are required to take a minimum of 24 credit hours of general education courses. These hours are distributed as indicated below.

1. Six credit hours in communications are required in the freshman engineering program. These are ENGL 101 or 103 and SPE 114.

2. The remaining 18 credit hours must be selected from two groups of course sequences, the first group being in the social sciences and the second group being in fine arts and humanities.

3. Each student must select one 12-hour sequence and one 6-hour sequence. No student may elect a 6-hour sequence from the same group from which he chose a 12-hour sequence.

GROUP I

12-hour sequences
History and Political Science
Sociology and Psychology
General Studies
    (Social Sciences Survey)
Economics

6-hour sequences
History
Political Science
Sociology
Psychology
Economics
Great Issues plus a variable
    credit reading course

GROUP II

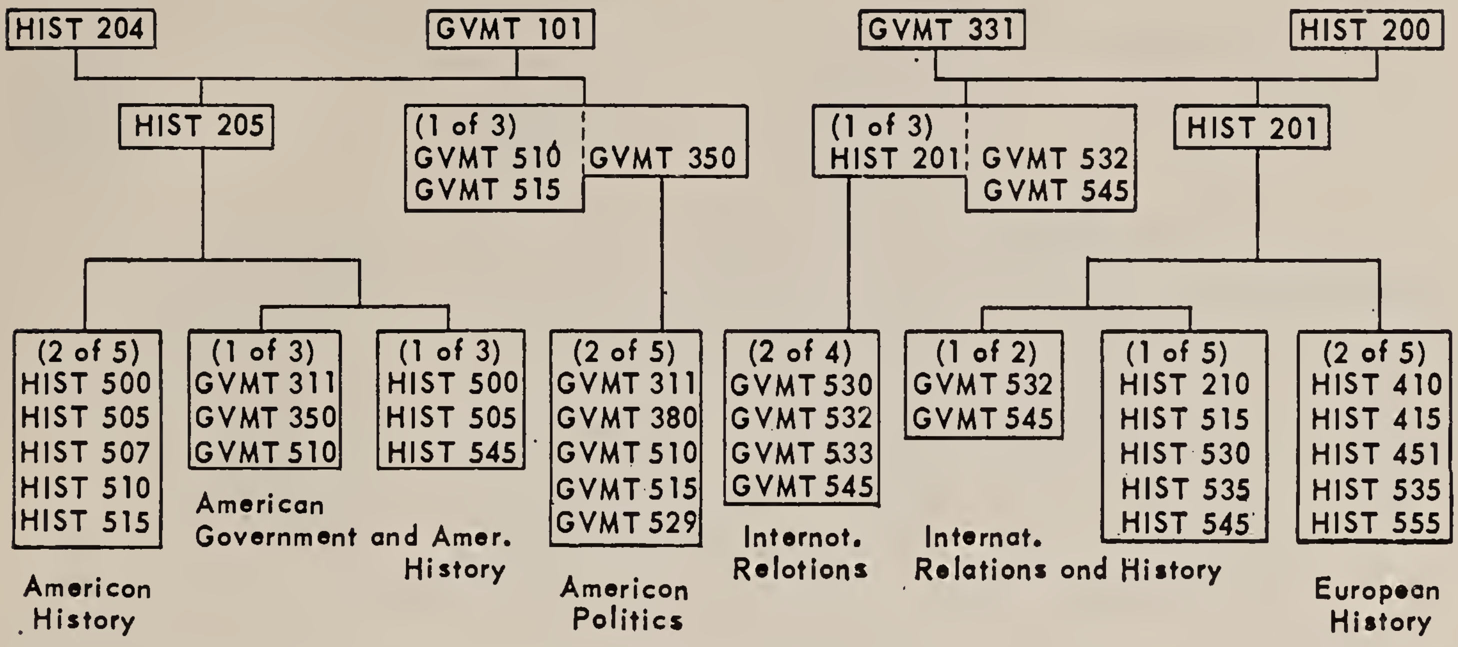
12-hour sequences
Speech and Theatre
Language

6-hour sequences
General Introduction to Literature
Speech
Theatre
Language
General Introduction to Philosophy
Creative Arts
Aesthetics and Appreciation

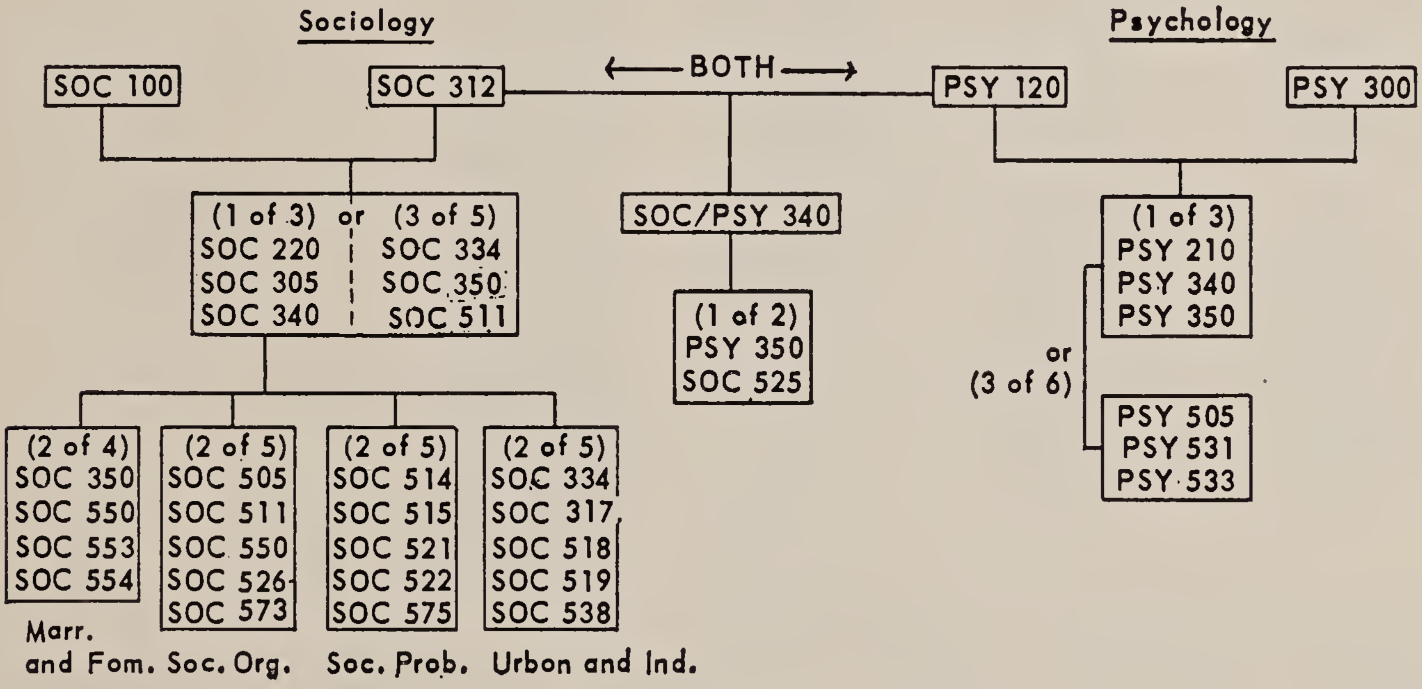
The above sequences are set up to give depth to the various programs in the social sciences, fine arts, and humanities. **A pamphlet stating the objectives of the program in general education is available from academic counselors.**

SOCIAL SCIENCES

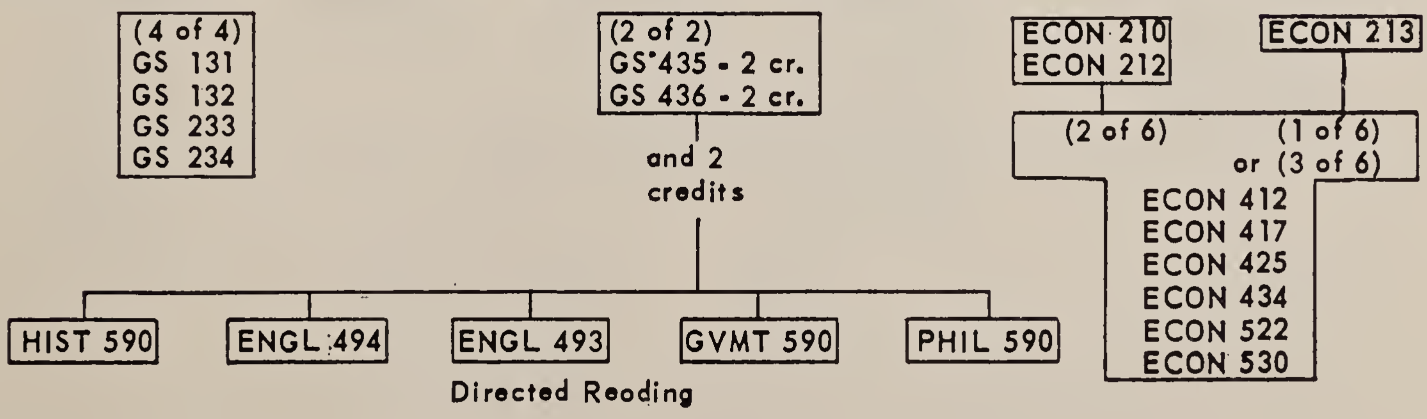
History and/or Government (6 or 12 hour sequences)


HIST 204
GVMT 101
GVMT 331
HIST 200
HIST 205
(1 of 3) GVMT 510 GVMT 515
GVMT 350
(1 of 3) HIST 201
GVMT 532 GVMT 545
HIST 201
(2 of 5) HIST 500 HIST 505 HIST 507 HIST 510 HIST 515
(1 of 3) GVMT 311 GVMT 350 GVMT 510
(1 of 3) HIST 500 HIST 505 HIST 545
(2 of 5) GVMT 311 GVMT 380 GVMT 510 GVMT 515 GVMT 529
(2 of 4) GVMT 530 GVMT 532 GVMT 533 GVMT 545
(1 of 2) GVMT 532 GVMT 545
(1 of 5) HIST 210 HIST 515 HIST 530 HIST 535 HIST 545
(2 of 5) HIST 410 HIST 415 HIST 451 HIST 535 HIST 555
American History
American Government and Amer. History
American Politics
Internat. Relations
Internat. Relations and History
European History

Psychology and/or Sociology (6 or 12 hour sequences)

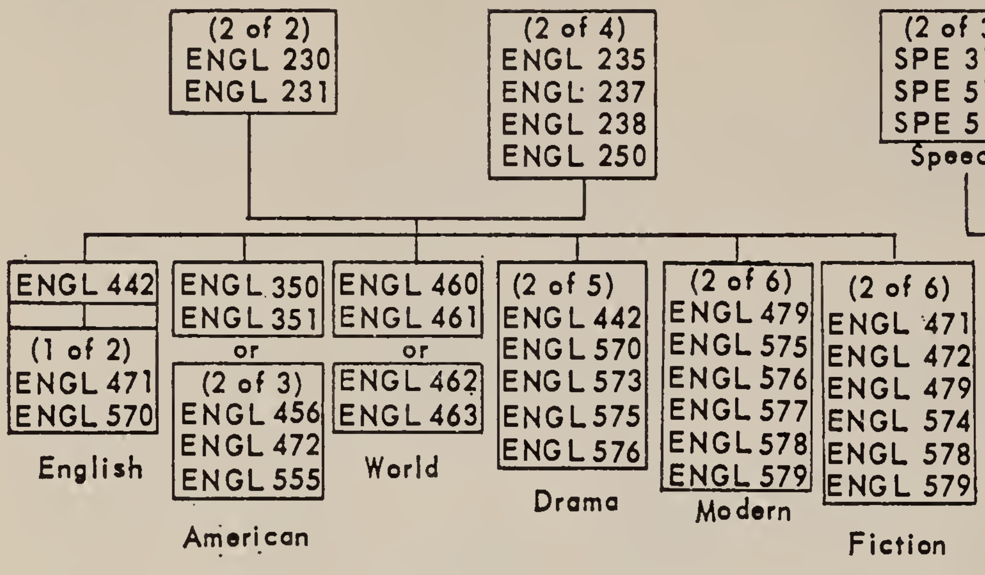

Sociology
Psychology
SOC 100
SOC 312
BOTH
PSY 120
PSY 300
(1 of 3) SOC 220 SOC 305 SOC 340
or
(3 of 5) SOC 334 SOC 350 SOC 511
SOC/PSY 340
(1 of 2) PSY 350 SOC 525
(1 of 3) PSY 210 PSY 340 PSY 350
or (3 of 6)
PSY 505 PSY 531 PSY 533
(2 of 4) SOC 350 SOC 550 SOC 553 SOC 554
(2 of 5) SOC 505 SOC 511 SOC 550 SOC 526 SOC 573
(2 of 5) SOC 514 SOC 515 SOC 521 SOC 522 SOC 575
(2 of 5) SOC 334 SOC 317 SOC 518 SOC 519 SOC 538
Marr. and Fam.
Soc. Org.
Soc. Prob.
Urban and Ind.

General Studies (12 hours only) Great Issues (6 hours only) Economics (6 or 12 hours)


(4 of 4) GS 131 GS 132 GS 233 GS 234
(2 of 2) GS 435 - 2 cr. GS 436 - 2 cr.
and 2 credits
HIST 590
ENGL 494
ENGL 493
GVMT 590
PHIL 590
Directed Reading
ECON 210 ECON 212
ECON 213
(2 of 6)
(1 of 6) or (3 of 6)
ECON 412 ECON 417 ECON 425 ECON 434 ECON 522 ECON 530

HUMANITIES

Literature (6 or 12 hours)



(2 of 2)
ENGL 230
ENGL 231

(2 of 4)
ENGL 235
ENGL 237
ENGL 238
ENGL 250

ENGL 442
(1 of 2)
ENGL 471
ENGL 570
English

ENGL 350
ENGL 351
or
(2 of 3)
ENGL 456
ENGL 472
ENGL 555
American

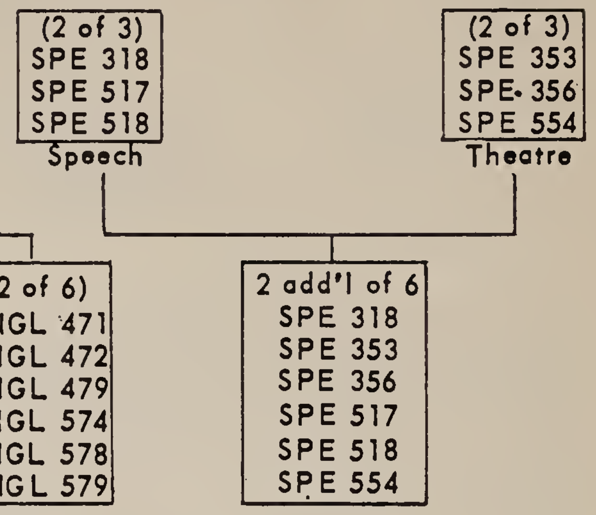
ENGL 460
ENGL 461
or
ENGL 462
ENGL 463
World

(2 of 5)
ENGL 442
ENGL 570
ENGL 573
ENGL 575
ENGL 576
Drama

(2 of 6)
ENGL 479
ENGL 575
ENGL 576
ENGL 577
ENGL 578
ENGL 579
Modern

(2 of 6)
ENGL 471
ENGL 472
ENGL 479
ENGL 574
ENGL 578
ENGL 579
Fiction

Speech and Theatre (6 or 12 hours)

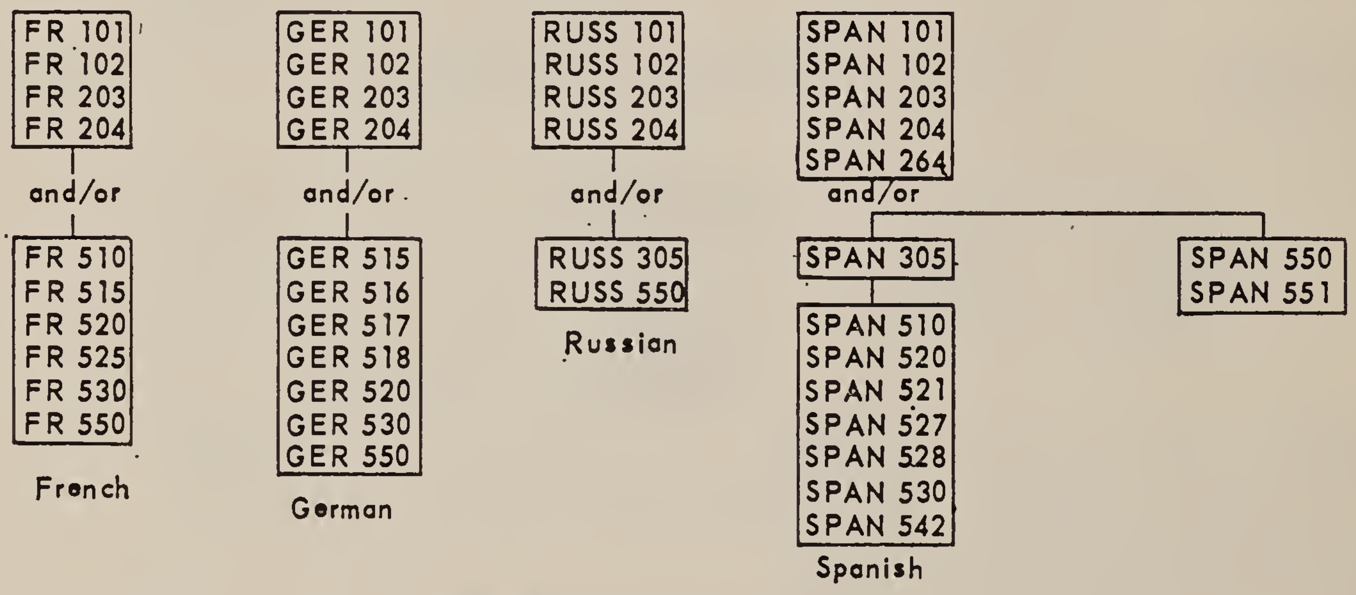


(2 of 3)
SPE 318
SPE 517
SPE 518
Speech

(2 of 3)
SPE 353
SPE 356
SPE 554
Theatre

2 add'l of 6
SPE 318
SPE 353
SPE 356
SPE 517
SPE 518
SPE 554

Foreign Language and Culture (6 or 12 hours)



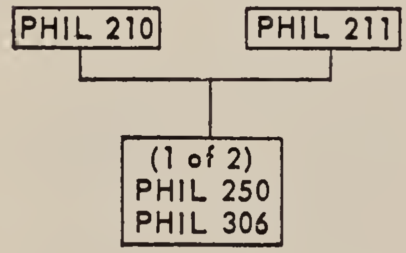
FR 101
FR 102
FR 203
FR 204
and/or
FR 510
FR 515
FR 520
FR 525
FR 530
FR 550
French

GER 101
GER 102
GER 203
GER 204
and/or
GER 515
GER 516
GER 517
GER 518
GER 520
GER 530
GER 550
German

RUSS 101
RUSS 102
RUSS 203
RUSS 204
and/or
RUSS 305
RUSS 550
Russian

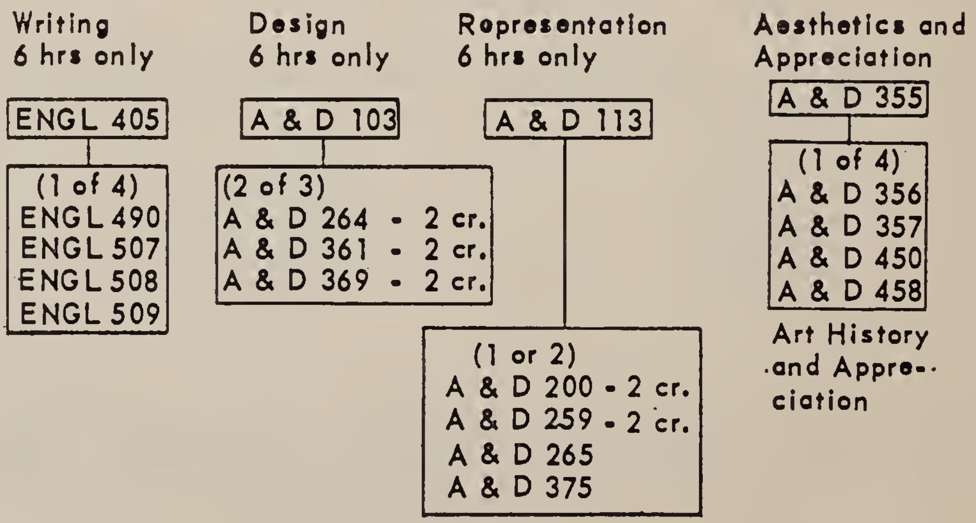
SPAN 101
SPAN 102
SPAN 203
SPAN 204
SPAN 264
and/or
SPAN 305
SPAN 510
SPAN 520
SPAN 521
SPAN 527
SPAN 528
SPAN 530
SPAN 542
SPAN 550
SPAN 551
Spanish

Philosophy (6 hours only)



PHIL 210
PHIL 211
(1 of 2)
PHIL 250
PHIL 306

Creative Arts



Writing
6 hrs only
ENGL 405
(1 of 4)
ENGL 490
ENGL 507
ENGL 508
ENGL 509

Design
6 hrs only
A & D 103
(2 of 3)
A & D 264 - 2 cr.
A & D 361 - 2 cr.
A & D 369 - 2 cr.

Representation
6 hrs only
A & D 113
(1 or 2)
A & D 200 - 2 cr.
A & D 259 - 2 cr.
A & D 265
A & D 375

Aesthetics and
Appreciation
A & D 355
(1 of 4)
A & D 356
A & D 357
A & D 450
A & D 458
Art History
and Appreciation

FRESHMAN ENGINEERING

Program A: Students fully qualified upon entrance.

First Semester		Second Semester	
Course Name	Credit Hrs.	Course Name	Credit Hrs.
CHM 115	4	CHM 116	4
MA 161	5	MA 162	5
SPE 114 or ENGL 101	3	ENGL 101 or SPE 114	3
ENGR 100	1	PHYS 152	4
Graphics, CE 118	3	PEMN 112	1
PEMN 112	1	General Elective	3
General Elective	3		
	20		20

Program B: Students with below average preparation in mathematics.

Course Name	Credit Hrs.	Course Name	Credit Hrs.
CHM 115	4	CHM 116	4
MA 151	5	MA 161	5
ENGL 101 or SPE 114	3	SPE 114 or ENGL 101	3
ENGR 100	1	Graphics, CE 118	3
PEMN 112	1	PEMN 112	1
General Elective	3	General Elective	3
	17		19

Program C: Students with below average preparation in chemistry.

Course Name	Credit Hrs.	Course Name	Credit Hrs.
CHM 100	3	CHM 115	4
MA 161	5	MA 162	5
SPE 114 or ENGL 101	3	ENGL 101 or SPE 114	3
ENGR 100	1	PHYS 152	4
Graphics, CE 118	3	PEMN 112	1
PEMN 112	1	General Elective	3
General Elective	3		
	19		20

Program D: Students with below average preparation in chemistry and mathematics.

Course Name	Credit Hrs.	Course Name	Credit Hrs.
CHM 100	3	CHM 115	4
MA 151	5	MA 161	5
ENGL 101 or SPE 114	3	SPE 114 or ENGL 101	3
ENGR 100	1	Graphics, CE 118	3
PEMN 112	1	PEMN 112	1
General Elective	3	General Elective	3
	16		19

MATHEMATICAL SCIENCES

The Division of Mathematical Sciences offers two basic plans of study leading to the Bachelor of Science degree.

Plan A is designed for students who intend to become professional mathematicians, either in industrial or government work or in college teaching and research. Variations in this plan will allow for specializations in pure mathematics, applied mathematics, and mathematical statistics. A student who hopes to pursue graduate work in mathematics or statistics is advised to elect plan A.

Plan B is intended to be suitable for a wide variety of students interested in mathematics, including in particular those desiring a broad general education with specialization in mathematics or statistics and those intending to become school mathematics teachers.

Prospective teachers should note that in addition to completing the requirements for the degree it is essential for them to complete the requirements for certification imposed by the state in which they expect to teach. They must also meet the special admission requirements of the Division of Education. Information about all of these requirements may be obtained from the Division of Education.

Mathematics

FRESHMAN YEAR

First Semester	Second Semester
(5) MA 161 (Mathematics for Engineering and Physical Sciences I)	(5) MA 162 (Mathematics for Engineering and Physical Sciences II)
(3) ENGL 101 (English Composition I)	(3) ENGL 202 (English Composition II)
(3) Social Science	(4) PHYS 152 (Mechanics)
(3) Modern Language	(3) Modern Language
(2) PE or Military	(2) PE or Military
(16)	(17)

DIVISION OF APPLIED TECHNOLOGY

Associate Degree Programs

The University has a number of two-year undergraduate programs leading to the Degree of Associate in Applied Science. The work offered in these programs is of University grade as are all undergraduate courses, but the offerings are much more applied in nature.

The associate degree is awarded to each student who satisfactorily completes the program of study in one of the curricula. Graduates can expect to be immediately employable in industry or may be admitted to the curricula leading to a degree of Bachelor of Science in Industrial Education.

In America the Engineers Council for Professional Development (ECPD), through its Subcommittee on Technical Institutes, is the recognized accrediting agency in this field. It defines these curricula as follows:

"Curricula to be considered are technological in nature and lie in the post-high-school area. They differ in content and purpose from those of the vocational school on one hand and from those of the engineering college on the other. Curricula in this field are offered by a variety of institutions, and cover a considerable range as to duration and content of subject matter, but have in common the following purposes and characteristics:

(1) The purpose is to prepare individuals for various technical positions or lines of activity encompassed within the field of engineering, but the scope of the programs is more limited than that required to prepare a person for a career as a professional engineer.

(2) Programs of instruction are essentially technological in nature, based upon principles of science and include sufficient post-secondary school mathematics to provide the tools to accomplish the technical objectives of the curricula.

(3) Emphasis is placed upon the use of rational processes in the principal fundamental portions of the curricula that fulfill the stated objectives and purposes.

(4) Programs of instruction are briefer and usually more completely technical in content than professional curricula, though they are concerned with the same general fields of industry and engineering. They lead to the associate degree.

(5) Training for artisanship is not included within the scope of education of technical institute type."

At the present time there are five programs operating at the Calumet Campus: architectural engineering technology, chemical and metallurgical engineering technology, mechanical engineering technology, electrical engineering technology, and industrial engineering technology.

CURRICULUM IN ARCHITECTURAL ENGINEERING TECHNOLOGY

This curriculum is designed to prepare students for technological employment with contractors, building materials suppliers, architects, civil engineers, and related governmental agencies.

Graduates are prepared to accept positions as estimators, expeditors, planning technicians, field inspectors, architectural detailers, architectural draftsmen, and sales representatives. With experience, after completing this program of study, graduates are now holding positions as field engineers, technical engineers, junior structural engineers, engineering assistants, shop superintendents, and real estate brokers. This field of specialization is well designed to help the student who is interested in going into the construction business for himself.

FRESHMAN YEAR

First Semester				Second Semester			
Course No.			Credit	Course No.			Credit
BC	104	Plan Reading	1	BC	156	Frame Construction	3
BC	116	Architectural Drawing	2	BC	164	Building Materials	3
GN	100	Orientation Lectures	1	DM	212	Mechanics of Materials	4
ENGL	101	English Composition	3	CE	113	Slide Rules and Graphs	1
MA	111	Algebra	3	MA	112	Trigonometry	3
PS	136	Physics: Mechanics and Heat	4	PS	176	Physics: Electricity, Sound and Light	4
PSY	120	Psychology	3				
BC	172	Systems of Construction	2				
			19				18

CURRICULUM IN MECHANICAL ENGINEERING TECHNOLOGY

This program of study has been designed to prepare students to take employment in industries requiring services of drafting and design of a mechanical nature.

Emphasis is placed on product and tool design, mechanical maintenance, testing, inspection, and the selection of methods for efficient and economical production.

Graduates of this program accept jobs as laboratory technicians, engineering assistants, detailers, draftsmen, tool maintenance men, plant maintenance men, layout men, inspectors, and machine and tool salesmen. With additional experience students may aspire to positions as industrial supervisors, machine and tool designers, tool buyers, production expeditors, and cost estimators.

FRESHMAN YEAR

First Semester				Second Semester			
Course No.			Credit	Course No.			Credit
CES	110	Drafting Fundamentals	3	DM	156	Graphical Computations	3
DM	180	Materials and Processes	3	DM	204	Production Drawing	3
ENGL	101	English Composition I	3	DM	212	Mechanics of Materials	4
MA	111	Algebra	3	MA	112	Trigonometry	3
PS	136	Physics: Mechanics and Heat	4	PS	176	Physics: Electricity, Heat, Sound	4
SOC	100	Introductory Sociology	3	CES	113	Slide Rules and Graphs	1
or							
PSY	120	Elementary Psychology	3				
			19				18

CURRICULUM IN INDUSTRIAL ENGINEERING TECHNOLOGY

This major field of specialization is designed to prepare students primarily for technological services in the industrial engineering areas of production planning and control, plant layout, quality control, job evaluation, and cost analysis. It also covers the essentials of management with which foremen, supervisors, and administrative personnel in general are concerned.

Typical jobs are time-study man, methods planner, production control clerk, stock supervisor, cost analyst, job analyst, and personnel interviewer.

Emphasis is placed upon courses in motion and time study, job evaluation, wage incentives, production and operation planning, plant layout, and industrial safety, and on courses in mathematics, physics, and chemistry.

FRESHMAN YEAR

Course	No.	First Semester	Credit	Course	No.	Second Semester	Credit
GN	100	Technical Institute Orientation Lectures	1	DM	180	Materials and Processes	3
ENGL	101	English Composition I	3	GN	52	Physical Education	0
PSY	120	Psychology	3	IT	152	Human Relations in Industry	3
IT	104	Industrial Organization and Production	4	IT	260	Motion and Time Study	3
MA	111	Algebra	3	MA	112	Trigonometry	3
PS	136	Physics: Mechanics and Heat	4	PS	176	Physics: Electricity, Sound, and Light	4
			18	CE	113	Slide Rules and Graphs	1
							17

SOPHOMORE YEAR

Course	No.	Third Semester	Credit	Course	No.	Fourth Semester	Credit
CES	110	Drafting Fundamentals	3	GN	64	Physical Education	0
GN	204	Fundamentals of Practical Speaking	2	GN	232	Democratic Government	2
GN	220	Technical Report Writing	3	GN	260	Economics of Industry	2
IT	224	Production Planning and Control	4	GN	264	Conference Speaking	2
IT	244	Fundamentals of Production Cost	2	IT	212	Industrial Safety	2
IT	272	Job Evaluation	2	IT	218	Production Cost Analysis	2
PS	120	Introduction to Chemistry	3	IT	268	Plant Layout	3
			19	IT	280	Wage Incentives	2
				IT	296	Industrial Technology Case Problems	2
				PS	204	Fundamentals of Quality Control	2
							19

SCHOOL OF SCIENCE, EDUCATION, AND HUMANITIES

Four bachelor's degrees are offered in the School of Science, Education, and Humanities: Bachelor of Arts, Bachelor of Science, Bachelor of Science in Industrial Education, and Bachelor of Physical Education. All programs leading to these four degrees have certain requirements in common.

BACHELOR OF ARTS AND BACHELOR OF SCIENCE

The program leading to the degree Bachelor of Science should be followed by students majoring in any of the various fields of science, including psychology and clinical speech, or in high school teaching in any of these fields. The program leading to the degree Bachelor of Arts should be followed by students majoring in any of the fields of humanities or social sciences (except psychology), in high school teaching in any of these fields, in preparation for a career in business, industry, or recreation leadership, or by women students preparing to teach physical education.

General Education Requirements

About one-half of the total program is devoted to the satisfaction of the "core requirements," which have been chosen with a view to broadening each student's background. The courses listed below in each field are those usually recommended for students who are not going to specialize in the particular area. The introductory courses for specialization will also satisfy these requirements. For example, MA 161 and 162 will satisfy the mathematics requirement. The general education requirements are:

Bachelor of Arts

English Composition (ENGL 101, 202)	6 hours
Literature (ENGL 230, 231)	6 hours
Developmental Reading (ENGL 185)	1 hour
Speech (SPE 114)	3 hours
Psychology (PSY 120)	3 hours
Foreign Languages (a proficiency test or the fourth semester course or higher in one modern language)	0 to 12 hours
Social Science (GVMT 101, HIST 205, SOC 100, and ECON 210, or a two-semester course in two of the subjects, economics, government, history, sociology)	12 hours
Natural Science and Mathematics: A two-semester course in any three of the following subjects: biological sciencese (BIO 108, 109 or BIO 103, 104), chemistry (CHM 111, 112), mathematics (MA 121, 122), Physics (PHYS 220, 221)	18 hours
Philosophy (PHIL 210 or 211)	3 hours
Humanities (two courses chosen from GS 370; modern language; all courses 300 or above in literature or civilization; PHIL 210, 211)	6 hours

Bachelor of Science

English Composition (ENGL 101, 202)	6 hours
Literature (ENGL 230, 231)	6 hours
Developmental Reading (ENGL 185)	1 hour
Speech (SPE 114)	3 hours
Psychology (PSY 120 or 300)	3 hours
Foreign Languages (a proficiency test or the fourth semester course or higher in one modern language)	0 to 12 hours
Social Sciences (GVMT 101, HIST 205, SOC 100, and ECON 210)	12 hours
Mathematics (MA 121, 122, or 152, or 161, 162)	6 hours
Chemistry or Physics	6 hours
Biological Sciences (BIO 108, 109)	6 hours
Philosophy (PHIL 210 or 211)	3 hours

For students enrolled in the professional options of biology, chemistry, physics, leading to graduate study, the requirement in psychology (PSY 120) is omitted, and the requirement in philosophy and Great Issues is replaced by Great Issues (4 hours), or PHIL 210 or 211, plus one course in the list approved under humanities above.

Area of Concentration

Before the end of his third semester, each student will select (1) an area of concentration or (2) a major and a minor. The area, or the major and minor, provides the concentration necessary for vocational preparation, for admission to a graduate school, for admission to a professional school, such as medical or law, for a teaching certificate, or for a general and well-rounded education.

An area program will require from 33 to 40 semester hours beyond the general education requirements. A major will require about 24 semester hours and a minor about 12. The requirements of the concentration area selected by the student become requirements for his graduation.

Each student must file his choice of area of concentration or major and minor at the office of the dean not later than the end of the third semester on forms available at that office. No student will be permitted to regiser as a junior unless his concentration choice has been filed. The choice of area of major and minor may be changed subsequently by the student, with permission of the dean. The following areas, majors and minors are available:

Areas

American Civilization
American Literature
American Government and Politics
Applied Statics
Biophysics
Biology Teaching
Botany
Chemistry
Chemistry and Mathematics Teaching
Chemistry and Physics Teaching
Creative Writing
Deliberative Speech
Dramatics
Economics
Elementary Education
English and Foreign Language Teaching
English Literature

English and Speech Teaching
Foreign Language Teaching
French
General Biology
Geology
German
Industrial Economics
International Relations
Latin American Economy
Library Science
Mathematics
Mathematical Statistics
Mathematics and Physics, or Chemistry Teaching
Mathematics Teaching
Medical Technology
Microbiology
Philosophy
Physical Education Teaching (Women)
Physics
Physics and Mathematics or Chemistry Teaching
Predentistry
Premedicine
Prephysical Therapy
Radio
Recreation Leadership
Russian
Social Studies Teaching
Sociology
Spanish
Speech
Speech Teaching
Speech and Hearing Therapy
Technical Writing
Zoology

Majors

American Government and Politics
Art Teaching
Commercial Art
Creative Writing
Economics
English and Speech Teaching
Family and Community Living
French
German
Geology
History
Interior Design
International Relations
Journalism
Literature (American or English)
Mathematics
Philosophy
Physical Education (Women)
Psychology
Recreation
Russian
Sociology
Spanish
Speech

Minors

Commercial Art
Economics
French
Geology
German
Health and Safety
History
Interior Design
Journalism
Literature
Philosophy
Mathematics
Psychology
Recreation
Russian
Sociology
Spanish
Speech

Each student's program for the four years will be based on one of five plans of study, appropriately modified to fit his concentration requirements and his exemptions, i.e., proficiency in modern language, ENGL 103, etc.

One plan of study is for concentration in the biological sciences, premedicine and predentistry; one for prepharmacy; one for chemistry; one for physics and mathematics; and one for all other areas of concentration.

Students interested in secondary teaching should apply to the Division of Education during the freshmen year. They will use the plan of study for the major subject-matter field, or comprehensive areas, of the teaching certificate for which they expect to qualify.

BACHELOR OF ARTS*—GENERAL PROGRAM

FRESHMAN YEAR

	First Semester		Second Semester
(3)	BIO 103 (Principles of Biology)	(3)	BIO 104 (Principles of Biology)
	or		or
(4)	BIO 108 (Introduction to Botany)	(4)	BIO 109 (Introduction to Zoology)
(3)	ENGL 101 (English Composition I)	(3)	SPE 114 (Principles of Speech)
(3)	MA 121 (General College Mathemathics I)	(3)	MA 122 (General College Mathematics II)
(3)	Modern Language	(3)	Modern Language
(3)	Social Science	(3)	Social Science
(1-3)	Elective or Physical Education	(1)	ENGL 185 (Developmental Reading)
		(1-3)	Elective or Physical Education
(16-19)		(17-20)	

SOPHOMORE YEAR

	First Semester		Second Semester
(3)	ENGL 230 (Introduction to Literature)	(3)	ENGL 231 (Introduction to Literature)
(3)	Social Science†	(3)	Social Science†
(3)	Modern Language	(3)	Modern Language
(3-4)	Physical Science	(3-4)	Physical Science
(3)	PSY 120 (Elementary Psychology)	(3)	ENGL 202 (English Composition II)
(1)	Physical Education	(1)	Physical Education
(16-17)		(16-17)	

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* Except for majors in Physical Education (Women), Elementary Education, and Drama.

† Industrial economics majors should take ECON 210 and 212.

BACHELOR OF SCIENCE—GENERAL PROGRAM

FRESHMAN YEAR

	First Semester
(3)	SPE 114 (Principles of Speech)
(3)	MA 121 (General College Mathematics I)
(3)	Modern Language
(4)	BIO 109 (Introduction to Zoology)
(3)	CHM 111 (General Chemistry)
(1-2)	Physical Education
(17-18)	

	Second Semester
(3)	ENGL 101 (English Composition I)
(3)	MA 122 (General College Mathematics I)
(3)	Modern Language
(4)	BIO 108 (Introduction to Botany)
(3)	CHM 112 (General Chemistry)
(1-2)	Physical Education
(17-18)	

SOPHOMORE YEAR

	Third Semester
(3)	ENGL 230 (Introduction to Literature)
(4)	PHYS 220 (General Physics)
(3)	Modern Language
(3)	ENGL 202 (English Composition II)
(3)	Social Science
(1-2)	Physical Education
(17-18)	

	Fourth Semester
(3)	ENGL 231 (Introduction to Literature)
(4)	PHYS 221 (General Physics)
(3)	Modern Language
(3)	PSY 120 (Elementary Psychology)
(3)	Social Science
(1-2)	Physical Education
(17-18)	

BIOLOGICAL SCIENCES

FRESHMAN YEAR

	First Semester
(3)	SPE 114 (Principles of Speech)
	or
(3)	ENGL 101 (English Composition I)
(3)	CHM 111 (General Chemistry)
(3)	BIO 103 (Principles of Biology)
	or
(4)	BIO 109 (Introduction to Zoology)
(3)	MA 121 (General College Mathematics I)
(3)	Modern Language*
(1-3)	Elective or Physical Education
(16-19)	

	Second Semester
(3)	ENGL 101 (English Composition I)
	or
(3)	SPE 114 (Principles of Speech)
(4)	CHM 112 (General Chemistry with Qualitative Analysis)
(3)	BIO 104 (Principles of Biology)
	or
(4)	BIO 108 (Introduction to Botany)
(3)	MA 121 (General College Mathematics I)
(3)	Modern Language*
(1-3)	Elective or Physical Education
(1)	ENGL 185 (Developmental Reading)
(18-21)	

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* German or Russian is recommended.

ELEMENTARY EDUCATION

Elementary Education

Preparation in elementary education is offered to a limited number of students chosen on the basis of above-average scholarship, leadership qualities, good mental and physical health, and positive attitudes toward children and teaching as a profession. In addition to the core program of all students and the professional program in elementary education the student will have 24 semester hours for a major in the field of his choice.

FRESHMAN YEAR

First Semester

(3) ENGL 101 or 103 (English Composition)
(3) GVMT 101 (Introduction to Government)
or
HIST 204 (American History to 1865)
(3) MA 121 (General College Mathematics I)
(3) Modern Language
(1) PEW 100 (Physical Education)
(1) PEW 103 (Personal Hygiene)
(3) SPE 114 (Principles of Speech)

(17)

Second Semester

(3) GVMT 102 (Introduction to Government)
or
HIST 205 (The U.S. and Its Place in World Affairs)
(3) MA 122 (General College Mathematics II)
(3) Modern Language
(3) ENGL 202 (English Composition II)
(1) ENGL 185 (Developmental Reading)
(1) PEW 100 (Physical Education)
(3) PSY 120 (Elementary Psychology)

(17)

SOPHOMORE YEAR

First Semester

(3) BIO 205 (Biology for Elementary Teachers)
(3) ENGL 230 (Introduction to Literature)
(3) SOC 100 (Introductory Sociology)
(3) CHM 113 (Introductory Chemistry)
(3) Modern Language
(1) PEW 100 (Physical Education)

(16)

Second Semester

(3) BIO 206 (Biology for Elementary Teachers)
(3) Aesthetics
(3) SOC 220 (Social Problems)
(3) CHM 114 (Introductory Chemistry)
(3) Modern Language
(1) PEW 100 (Physical Education)
(3) Second Major

(19)

CHEMISTRY

FRESHMAN YEAR

	First Semester		Second Semester
(4-5)	CHM 115 (General Chemistry) or CHM 117 (Advanced General Chemistry)	(4-5)	CHM 116 (General Chemistry) or CHM 126 (Advanced General Chemistry with Qualitative Analysis)
(3)	ENGL 101 (English Composition I)	(3)	SPE 114 (Principles of Speech)
(3)	Modern Language*	(3)	Modern Language*
(5)	MA 161 (Mathematics for Engineering and the Physical Sciences I)	(5)	MA 162 (Mathematics for Engineering and the Physical Sciences II)
(1-3)	Elective or Physical Education	(1-3)	Elective or Physical Education
		(1)	ENGL 185 (Developmental Reading)
(16-19)		(17-20)	

PSYCHOLOGY

FRESHMAN YEAR

	First Semester		Second Semester
(4)	BIO 108 (Introduction to Botany)	(4)	BIO 109 (Introduction to Zoology)
(3)	ENGL 101 (English Composition I)	(1)	ENGL 185 (Developmental Reading)
(3)	Social Science	(3)	ENGL 202 (English Composition II)
(3)	MA 121 (General College Mathematics I)	(3)	Social Science
(3)	SPE 114 Principles of Speech	(3)	MA 121 (General College Mathematics II)
(3)	Modern Language	(3)	PSY 120 (Elementary Psychology)
		(3)	Modern Language
(19)		(20)	

PHARMACY CURRICULUM

In conformity with requirements adopted by the American Council on Pharmaceutical Education, the American Association of Colleges of Pharmacy, the National Association of Boards of Pharmacy, and the American Pharmaceutical Association, every candidate for a degree in pharmacy must complete not less than five academic years of education.

The major purposes of the five-year curriculum are to provide for a broader general and cultural education, make possible a better sequence and integration of courses, and allow for greater flexibility in class schedules, faculty, assignments, and the use of facilities.

The five-year program at Purdue consists of one year of prepharmacy and four years of professional instruction. Students who carefully plan and select appropriate courses may take one or, in special cases, two years of the curriculum in extension centers or other colleges. The five-year curriculum provides for the selection of an optional program after completion of the first three years, namely, a professional option in preparation for general practice or a scientific option in preparation for industry, research, and teaching. Students who meet the requirements of the Graduate School may be permitted to gain up to 18 credit hours toward the M.S. degree for approved work taken in the fifth year when such credits are in excess of the requirements for the B.S. degree.

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*German or Russian is recommended.

PREPHARMACY

FRESHMAN YEAR

	First Semester		Second Semester
(3)	MA 111 (College Algebra)	(3)	MA 112 (Trigonometry)
(3)	CHM 111 (General Chemistry)	(3)	CHM 112* (General Chemistry, Qualitative Analysis)
(3)	ENGL 101 (English Composition)	(3)	SPE 114 (Principles of Speech)
(3)	SOC 100 (Introductory Sociology)	(3)	PSY 120 (Elementary Psychology)
(1-3)	Physical Education or Elective	(1-3)	Physical Education or Elective
(1)	PHAR 100 (Pharmacy Orientation)	(1)	ENGL 185 (Developmental Reading)
(15-17)		(15-17)	

INDUSTRIAL EDUCATION OPTION

The four-year curriculum in industrial education which leads to the degree of Bachelor of Science in Industrial Education is designed to prepare the student to qualify in one of the following fields: (1) vocational industrial teaching, (2) industrial arts, (3) industrial training. Completion of this curriculum also fulfills the professional training requirements specified by the Indiana State Teacher Training and Licensing Commission. Individuals with qualified industrial experience may request an evaluation of it for credit purposes.

In order to achieve any of these objectives, each student is required to complete a basic curriculum which includes the subjects listed below. Provision is then made for majoring in one of the subject-matter fields.

Applied Technology Teaching Major

The increased demand for technicians of all kinds has brought about a greatly expanded need for instructors qualified to teach subjects in applied technology in junior college divisions of technology and in technical institutes. Graduates of the two-year curricula of the Purdue University Division of Applied Technology are particularly well-prepared to specialize in this major. The plan of study includes advanced courses in mathematics, sciences, and technology plus courses in principles of education, methods of teaching, and course of study organization and planning.

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* An additional semester of qualitative analysis (CHM 223) will be required if CHM 111-112 are taken in the Freshman year.

FRESHMAN YEAR

First Semester		Second Semester	
(3)	CES 110 (Drafting Fundamentals)	(3)	MA 112 Trigonometry
(3)	ENGL 101 (English Composition I)	(3)	SOC 100 (Introductory Sociology)
(1)	ENGL 185 (Developmental Reading)	(3)	SPE 114 (Principles of Speech)
(3)	GVMT 101 (Introduction to Government)	(3)	PSY 120 (Elementary Psychology)
(3)	MA 111 (Algebra)	(3)	CHM 112 (General Chemistry)
(3)	CHM 111 (General Chemistry)	(3)	ENGL 202 (English Composition II)
(1)	Physical Education	(1)	Physical Education
(17)		(19)	

PRE-INDUSTRIAL MANAGEMENT*

FRESHMAN YEAR

First Semester		Second Semester	
(4)	CHM 115 (General Chemistry)	(4)	CHM 116 (General Chemistry)
(5)	MA 151† (Elementary Mathematics I)	(5)	MA 161 (Mathematics for Engineering and Physical Sciences I)
(3)	ENGL 101 (English Composition I)	(3)	SPE 114 (Principles of Speech)
(3)	GVMT 101‡ (Introduction to Government)	(3)	HIST 205 (The United States and Its Place in World Affairs)
(1)	ENGL 185 (Developmental Reading)	(1)	INDM 100 (Management Lectures)
(1-3)	Physical Education or Elective	(1-3)	Physical Education or Elective
(17-19)		(17-19)	

PHYSICAL EDUCATION FOR MEN— COACHING AND TEACHING OPTION

FRESHMAN YEAR

First Semester		Second Semester	
(4)	BIO 109 (Introduction to Zoology)	(4)	BIO 108 (Introduction to Botany)
(3)	ENGL 101 (English Composition I)	(3)	ENGL 202 (English Composition II)
(3)	SOC 100 (Introductory Sociology)	(3)	SPE 114 (Principles of Speech)
(3)	PSY 120 (Elementary Psychology)	(3)	SOC 220 (Social Problems)
(3)	ENGL 230 (Introduction to Literature)	(3)	Social Science
		(1)	ENGL 185 (Developmental Reading)
(16)		(17)	

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* Pre-Industrial Management taken as the pre-industrial option in the School of Science, Education, and Humanities.

† Qualified students should take MA 161. MA 161 with a grade of C or better will count ten hours toward graduation requirements.

‡ After freshman year, GVMT 301 (Elements of Democracy) must be substituted for GVMT 101.

PHYSICAL EDUCATION (WOMEN)

Women students may choose an area of concentration in physical education or in recreation leadership to prepare to qualify for teaching, or for such positions as health education secretary in the Young Women's Christian Association, industrial or community recreation director, Girl Scout or Camp Fire Girls professional leader, Red Cross field secretary and recreation director, counselor in summer camps, and playground director.

FRESHMAN YEAR

First Semester

(3) ENGL 101 or 103 (English Composition)
(3) SPE 114 (Principles of Speech)
(3) MA 121 (General College Mathematics I)
(3) Modern Language
(3) Social Science
(3-4) Elective or Physical Education

(18-19)

Second Semester

(3) ENGL 230 or 231 (Introduction to Literature)
(3) PSY 120 (Elementary Psychology)
(3) MA 122 (General College Mathematics II)
(3) Modern Language
(3) Social Science
(1) ENGL 185 (Developmental Reading)
(1-3) Elective or Physical Education

(17-19)

PHYSICS

FRESHMAN YEAR

First Semester

(3) ENGL 101 (English Composition I)
or
ENGL 103
(3) GVMT 101 (Introduction to Government)
(4) CHM 115 (General Chemistry)
(1) Physical Education
(5) MA 161 (Mathematics for Engineering and Physical Sciences I)
(1) ENGL 185 (Developmental Reading)

(17)

Second Semester

(3) HIST 205 (The U. S. and Its Place in World Affairs)
(4) CHM 116 (General Chemistry)
(1) Physical Education
(5) MA 162 (Mathematics for Engineering and Physical Sciences II)
(4) PHYS 152 (Mechanics and Sound)

(17)

SCHOOL OF AGRICULTURE

The School of Agriculture trains students for many types of agricultural work, including not only farming but also related educational and industrial activities. Programs of study are offered in forestry and conservation. Twelve departments in the School of Agriculture offer optional programs preparing students for jobs in research, teaching, and extension, as well as in various related commercial enterprises. Instructional work is based on fundamental training in biology, chemistry, and physics, together with courses in history, economics, English, psychology, and other similar fields.

GENERAL OPTION

FRESHMAN YEAR

	First Semester		Second Semester
(4)	BIO 109 (Introduction to Zoology)	(4)	BIO 108 (Introduction to Botany
(3)	CHM 111 (General Chemistry)	(3)	CHM 112 (General Chemistry)
(3)	ENGL 101 (English Composition I)	(3)	SPE 114 (Principles of Speech)
(6)	Electives	(3)	MA 111 (Algebra)
(1)	Physical Education	(6)	Electives
		(1)	Physical Education
(17)		(20)	

FORESTRY AND CONSERVATION

The Department of Forestry and Conservation offers eight-semester undergraduate plans of study in forest production, wood utilization, wildlife conservation, and conservation education, leading to Bachelor of Science degrees. Instruction given in forestry by the Department of Forestry and Conservation is recognized and approved by the Society of American Foresters and by accrediting agencies as meeting the highest professional standards.

The aim of forestry and conservation education at Purdue University is to give the student a broad training in fundamental concepts of his chosen field. To accomplish this aim, the student is given a thorough background in physical and biological sciences. Upon this science background is built professional instruction in the field of his choice.

FRESHMAN YEAR

Common to all Forestry curricula

	First Semester		Second Semester
(4)	BIO 108 (Introduction to Botany)	(4)	BIO 109 (Introduction to Zoology)
(3)	CHM 111 (General Chemistry)	(3)	CHM 112 (General Chemistry)
(3)	ENGL 101 (English Composition I)	(3)	ENGL 202 (English Composition II)
(3)	MA 111 (Algebra)	(3)	MA 112 (Trigonometry)
(3)	Elective	(3)	Elective
(1)	Physical Education	(1)	Physical Education
(17)		(17)	

PREVETERINARY SCIENCE AND MEDICINE CURRICULUM

An organized four-semester preveterinary curriculum, meeting requirements for admission to the School of Veterinary Science and Medicine, is available in the School of Agriculture.

This curriculum provides a strong program in the biological and physical sciences, which may be used as a basis for continued training in the School of Agriculture should the degree, Bachelor of Science in Agriculture, be desired.

FIRST YEAR

	First Semester		Second Semester
(3)	ENGL 101 (English Composition I)	(3)	SPE 114 (Principles of Speech)
(4)	BIO 109 (Introduction to Zoology)	(4)	BIO 108 (Introduction to Plant Life)
(3)	MA 111 (Algebra)	(3)	MA 112 (Trigonometry)
(4)	CHM 109* (General Chemistry)	(4)	CHM 110* (General Chemistry with Qualitative Analysis)
(1)	Physical Education	(1)	Physical Education
(3)	Elective	(3)	Elective
(18)		(18)	

SCHOOL OF HOME ECONOMICS

The plan of study in home economics is designed to prepare young men and women for professional work in the various areas of the field and at the same time to provide a broad general education which prepares the student to meet the needs for home and community living.

Areas of concentration include art and design, child development (nursery-kindergarten), clothing and textiles, foods and nutrition, food management, foods in business, food research, home economics extension, housing, and vocational home economics teaching.

Students interested in preparation for work in the fields mentioned above should enroll in the curriculum listed below.

FRESHMAN YEAR

	First Semester		Second Semester
(3)	ENGL 101 or 103 (English Composition)	(3)	ENGL 202 (English Composition II)
(3)	CHM 111 (General Chemistry)	(3)	CHM 112 (General Chemistry)
(3)	MA 121 (Algebra)	(3)	ENGL 230 (Introduction to Literature)
(3)	SOC 100 (Introductory Sociology)	(3)	PSY 120 (Elementary Psychology)
(3)	SPE 114 (Principles of Speech)	(3)	ECON 210 (Principles of Economics)
(1)	PEW 100 (Physical Education)	(1)	PEW 100 (Physical Education)
(1)	PEW 103 (Hygiene)	(1)	ENGL 115 (Developmental Reading)
(17)		(17)	

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* The requirement of CHM 109 and 110 may be met by completing CHM 111, 112, and 223.

DESCRIPTION OF COURSES

Courses numbered 1 to 499 are primarily for undergraduate students. Courses numbered 500 to 599 are for undergraduates (usually juniors and seniors) and graduate students. Courses numbered 600 and above are for graduate students.

For each course the first part of the description should be interpreted as follows: first, the official number of the course; second, its special title; and third, the number of class, laboratory, and credit hours.

SCHOOL OF AGRICULTURE

Dean Butz in charge

Agronomy

430. **GENETICS.** Sem. 1 and 2. Class 2, Lab. 2, cr. 3. Must be preceded by BIO 108 or 109 or equivalent.

For science and agriculture students. Basic principles of heredity, and an introduction to human genetics and plant and animal breeding.

Entomology

100. **INTRODUCTORY ENTOMOLOGY.** Sem. 1 and 2. Class 2, Lab. 2, cr. 3 (el. 1 to 4 A, S, H, PEM).

The structure, biology, and classification of insects and the principles of insect control.

Agricultural Economics

100. **INTRODUCTORY AGRICULTURAL BUSINESS AND ECONOMICS.** Sem. 1 and 2. Class 3, cr. 3 (el. 1 or 2 A).

The role and characteristics of farm and off-farm agricultural businesses in our economy; introductory economic and business principles involved in successful organization, operation, and management.

Forestry and Conservation

103. **CONSERVATION.** Sem. 1. Class 2, cr. 2, or Class 2, Lab. 2, cr. 3 (1 F, 2 cr.; el. 5, 6, 7, 8, 2 or 3 cr.).

Development and use of natural resources, with special emphasis on renewable natural resources. Lectures. Directed program of supplemental reading for additional credit.

SCHOOLS OF ENGINEERING

FRESHMAN ENGINEERING

Professor Spalding in charge

100. **FRESHMAN ENGINEERING LECTURES.** Class 1, cr. 1.

An introduction to the engineering profession.

SCHOOL OF CHEMICAL ENGINEERING

Professor Golding in charge

205. CHEMICAL ENGINEERING CALCULATIONS. Sem. 1 and 2. SS. Class 3, cr. 3. (3 CHE). Must be preceded by CHM 116 or 117, MA 161, PHYS 152, or equivalent.

Quantitative applications of material and energy balances to the chemical process industries. The use of chemical equations, yield of a chemical process; handling of multiple, by-pass, and recycle streams; and introduction to the first law of thermodynamics.

206. INTRODUCTION TO THE CHEMICAL PROCESS INDUSTRIES. Sem. 1 and 2. SS. Class 2, cr. 2. (4 CHE). Must be preceded by CHE 205, CHM 120 or 126, PHYS 251, or equivalent.

Importance and applications of flow diagrams and equipment and process economics to the chemical process industries. Studies of selected commercial chemical processes. Advanced chemical engineering calculations.

SCHOOL OF CIVIL ENGINEERING

Professor Woods in charge

CES 110. DRAFTING FUNDAMENTALS. Sem. 1. Class 1, Lab. 6, cr. 3. (1 IED, el.).

Designed for teachers of drawing. A basic course in drawing; orthographic projection, pictorial sketching, print reading, and reproduction of drawings. Problems designed to require practical reasoning and develop good techniques.

CES 111. ADVANCED DRAFTING. Sem. 1 and 2. Class 1, Lab. 6, cr. 3. (2 IED, el.). Must be preceded by CES 110.

Preparation of assembly and detail drawings, including fasteners, limit dimensioning, and shop notes. Intersections and developments with sheet metal applications. Symbols and construction details used in architectural drafting.

113. SLIDE RULES AND GRAPHS. Lab. 2, cr. 1. Must be preceded or accompanied by MA 112 or 151.

Principles and use of the slide rule for division, multiplication, trigonometry, powers, and roots. Properties and types of coordinate graphs for scientific and engineering purposes; calculation and plotting graphs: uniform, log, semilog, and others.

118. ENGINEERING GRAPHICS. Class 1, Lab. 6, cr. 3. Must be preceded or accompanied by MA 151 or 161.

Graphical methods used in engineering design, layout, and calculation. Multiview and pictorial drawing and sketching of technical objects; basic dimensioning practice; conventional representation.

CES 212. DESCRIPTIVE GEOMETRY. Sem. 2. Class 1, Lab. 5, cr. 3. Must be preceded by CES 110 and 111, or CE 118.

204. ENGINEERING SURVEYS I. Sem. 1 or 2. SS. Class 0, Lab. 6, cr. 2. (3 CE). Must be preceded or accompanied by MA 162.

Mensuration through the application of surveying techniques; the theory of errors and their analysis; fundamental concepts of horizontal, vertical, and angular measurement; basic surveying operations and computations.

270. STRUCTURAL MECHANICS I. Sem. 1 or 2. Class 2, Lab. 3, cr. 3. (4 CE). Must be preceded by ESC 211.

Analysis of statically determinate structures; reactions, shears, bending moments, and direct stresses due to fixed and moving loads; influence lines and loading criteria for beams and framed structures.

SCHOOL OF ELECTRICAL ENGINEERING

Professor Hayt in charge

203. CIRCUITS I. Class 4, Lab. 3, cr. 4. Must be preceded or accompanied by MA 261 and PHYS 261.

Fundamental properties of electric and magnetic circuits. Basic concepts, circuit elements, and source functions. Response of simple circuits. Transformations. Sinusoidal steady-state analysis.

204. CIRCUITS II. Class 4, Lab. 3, cr. 4. Must be preceded by EE 203 and preceded or accompanied by MA 262.

Continuation of EE 203. The complex-frequency plane, impedance and admittance functions, network analysis and theorems, nonsinusoidal periodic functions.

SCHOOL OF AERONAUTICAL AND ENGINEERING SCIENCES

Professor DeGroff in charge

ESC 205. BASIC MECHANICS I. Class 3, cr. 3. Must be preceded by MA 162 and PHYS 152.

Fundamental concepts, force systems, graphical representation of force systems, equilibrium, distributed forces, hydrostatics, virtual work, static stability, friction. First and second moments of areas, volumes, and masses, center of gravity. Application to structural and machine elements, such as bars, beams, trusses, cables, friction devices.

ESC 206. BASIC MECHANICS II. Class 3, cr. 3. Must be preceded by ESC 205 and MA 261.

Fundamental concepts, kinematics, translation, and rotation. Kinetics, impulse, momentum, work, energy. Rectilinear and curvilinear translation of point masses. Plane motion of rigid bodies and vibration. Application to projectiles, gyroscopes, machine elements, and other engineering systems.

ESC 211. STATICS AND DYNAMICS. Sem. 1. Class 4, cr. 4. (3 CE). Must be preceded by PHYS 152 and preceded or accompanied by MA 261.

Composition and resolution of force systems; equilibrium of force systems; friction; centroids; moments of inertia; virtual work kinematics; kinetics impulse and momentum; vibrations.

ESC 212. INTRODUCTION TO MECHANICS OF MATERIALS. Sem. 2. Class 3, cr. 3. (4 CE). Must be preceded by ESC 211 and preceded or accompanied by CE 270.

Concepts of stress and strain; effect of loads; analysis of plane stress and strain; deflection of beams; columns; stress in thin-walled pressure vessels; bending combined with axial loads; stress concentrations.

SCHOOL OF MECHANICAL ENGINEERING

Professor Grosh in charge

200. THERMODYNAMICS I. Class 4, cr. 3. Must be preceded by MA 261.

First and second laws, entropy, reversible and irreversible process, Maxwell relations, and properties of pure substances and mixtures.

DIVISION OF MATHEMATICAL SCIENCES

Professor Haas in charge

Students expecting to major in mathematics, physics, or chemistry, and all engineering students, will take MA 161, 162, 261, and 262. If their preparation is inadequate for this series of courses, they will take MA 151, 161, 162, 261, and 262.

1. HIGH SCHOOL ALGEBRA. Sem. 1. Class 5, cr. 0. Credit: one unit for admission.

2. PLANE GEOMETRY. Class 5, cr. 0. Credit: one unit for admission.

111. ALGEBRA. Class 3, cr. 3.

112. TRIGONOMETRY. Class 3, cr. 3. Should be preceded by MA 111.

115. ALGEBRA. Class 4, cr. 4. (Offered only by the Division of University Centers.)

116. ANALYTIC GEOMETRY. Class 4, cr. 4. (Offered only by the Division of University Centers.)

Plane and solid analytic geometry.

121. GENERAL COLLEGE MATHEMATICS I. Sem. 1 and 2. Class 3, cr. 3.

122. GENERAL COLLEGE MATHEMATICS II. Sem. 1 and 2. Class 3, cr. 3.

151. ELEMENTARY MATHEMATICS FOR ENGINEERING AND THE PHYSICAL SCIENCES. Sem. 1 and 2. SS. Class 5, cr. 5. (op. 1 ENGR, M, S).

College algebra and trigonometry for students with inadequate preparation for MA 161. Does not carry credit toward graduation in the Schools of Engineering and the Division of Mathematical Sciences.

161. MATHEMATICS FOR ENGINEERING AND THE PHYSICAL SCIENCES I. Sem. 1 and 2. SS. Class 5, cr. 5. (1 Engr. M, op. 1S).

Analytic geometry and calculus: derivatives of algebraic functions. Required of all students majoring in mathematics, physics, chemistry and all engineering students. Students with inadequate preparation will be required to take MA 151.

162. MATHEMATICS FOR ENGINEERING AND THE PHYSICAL SCIENCES II. Sem. 1 and 2. SS. Class 5, cr. 5. (2 Engr. M, op. 2S). Must be preceded by MA 161.

Calculus: Intergrals, applications of derivatives and integrals, formal integration.

221. ANALYTIC GEOMETRY DIFFERENTIAL CALCULUS. Sem. 1. Class 3, cr. 3. (op. 3 F, el.). Must be preceded by MA 111 and 112 or equivalent.

222. ANALYTIC GEOMETRY, INTEGRAL CALCULUS. Sem. 2. Class 3, cr. 3. (op. 4 F, el.). Must be preceded by MA 221.

241. CALCULUS I. Class 4, cr. 4. (3 ENGR, op. 3 S). (Offered at Extension Centers only.)

242. CALCULUS II. Class 4, cr. 4. (4 ENGR, op. 4 S). (Offered at Extension Centers only.) Must be preceded by MA 241.

261. MATHEMATICS FOR ENGINEERING AND THE PHYSICAL SCIENCES III. Sem. 1 and 2. SS. Class 4, cr. 4. (3 Engr. M, op. 3S). Must be preceded by MA 162.

Calculus: Indeterminate forms, parametric equation, solid analytic geometry, partial differentiation, multiple integrals.

262. MATHEMATICS FOR ENGINEERING AND THE PHYSICAL SCIENCES IV. Sem. 1 and 2. SS. Class 4, cr. 4. (4 Engr. M, op. 4S). Must be preceded by MA 261.

Calculus: Infinite series, elements of differential equations.

351. ELEMENTARY LINEAR ALGEBRA. Sem. 1 and 2. Class 3, cr. 3. Must be preceded by MA 261.

Systems of linear equations, finite dimentional vector spaces, matrices, determinants, applications to analytic geometry.

421. DIFFERENTIAL EQUATIONS. Sem. 1 and 2. SS. Class 3, cr. 3. (op. or el.). Not open to students with credit in MA 422. Must be preceded by differential and integral calculus.

Derivation and solution of differential equations for problems in applied fields.

422. DIFFERENTIAL EQUATIONS FOR ENGINEERING AND THE PHYSICAL SCIENCES. Class 3, cr. 3. Not open to students with credit in MA 421. Must be preceded by MA 262.

Derivation and solutions of additional types of differential equations for problems in science and engineering.

DUAL LEVEL—UNDERGRADUATE AND GRADUATE

501. TECHNIQUES OF APPLIED MATHEMATHICS I. Sem. 1 and 2. SS. Class 3, cr. 3. Must be preceded by MA 262 or equivalent.

This is strictly a methods course. MA 501, 502 are inadequate substitutes for MA 510 and/or 511 where the latter are used as prerequisites. MA 501, 502 are not acceptable for graduate credit in some engineering programs.

Matrices, determinants, complex functions; Fourier series, harmonic analysis; numerical methods.

502. TECHNIQUES OF APPLIED MATHEMATICS II. Sem. 1 and 2. SS. Class 3, cr. 3. Must be preceded by MA 501.

Continuation of MA 501. Gamma, Beta, and Bessel functions, elliptic integrals; vector algebra and calculus; solution of Laplace, wave, and heat equations by Fourier and Fourier-Bessel series; Laplace transform.

510. ADVANCED CALCULUS. Sem. 1 and 2. SS. Class 3, cr. 3. Must be preceded by MA 262 or equivalent.

Functions of several variables; partial derivative, differential; quadratic approximation, extrema; vector calculus, gradient; line, surface, and volume integrals; divergence, curl, Laplacian, integral theorems; mappings, continuity, differentiability, inverse mapping; implicit functions; orthogonal coordinates; weight functions. Stielties integral, delta-measure.

523. **INTRODUCTION TO PARTIAL DIFFERENTIAL EQUATIONS.** Sem. 2. SS. (1962) Class 3, cr. 3. Must be preceded by MA 510 and by MA 422 or equivalent.

Method of characteristics for quasilinear first-order equations; complete integral; Cauchy-Kowalewsky theory; classification of second-order equations in two variables; canonical forms; difference methods for hyperbolic and parabolic equations; Poisson integral method for elliptic equations.

525. **INTRODUCTION TO COMPLEX ANALYSIS.** Sem. 1 and 2. SS. Class 3, cr. 3. Must be preceded by MA 510.

Complex numbers and complex-valued functions; differentiation of complex-functions; power series, uniform convergence; integration, contour integrals; elementary conformal mapping.

549. **CALCULUS FOR TEACHERS.** SS. Class 3, cr. 3. Must be preceded by MA 261.

A critical study of the basic concepts of analytic geometry and calculus with applications. Designed for secondary school teachers.

550. **ALGEBRA I.** Sem. 1 and 2. SS. Class 3, cr. 3. Must be preceded by MA 351 or graduate standing.

Definitions and elementary properties of groups, rings, integral domains, fields, vector spaces and matrices with major emphasis on the rings of integers, rational numbers, complex numbers and polynominals. Intended primarily for secondary school teachers.

551. **ALGEBRA II.** Sem. 1 and 2. SS. Class 3, cr. 3. Must be preceded by MA 550.

A continuation of MA 550.

Statistics

311. **INTRODUCTION TO ENGINEERING STATISTICS.** Sem. 1 and 2. SS. Class 3, cr. 3. Must be preceded by MA 261 or equivalent.

Descriptive statistics, introduction to probability, moments, the binominal, Poisson and normal distribution, curve fitting, correlation, and some tests of hypotheses.

351. **ELEMENTARY STATISTICS.** Sem. 1. Class 3, cr. 3 (op. 3 S, el.). Must be preceded by MA 111 and 112 or 121 and 122 or equivalent.

An introductory and preparatory course for both mathematical and applied statistics. Emphaisis on underlying concepts and logic of statistical methods as well as on computational techniques.

352. **ELEMENTARY STATISTICS.** Sem. 2. Class 3, cr. 3 (op. 4 S, el.).

Continuation of STAT 351.

DUAL LEVEL—UNDERGRADUATE AND GRADUATE

511. **STATISTICAL METHODS I.** Sem. 1 and 2. SS. Class 3, cr. 3. Not open to students with credit in STAT 501. Must be preceded by MA 262 or permission of instructor.

Descriptive statics for one or two variables of measurement, curve fitting, frequency distributions, regression and correlation, statistical inference, application to engineering problems, including control charts and acceptance sampling.

512. **STATISTICAL METHODS II.** Sem. 2. Class 3, cr. 3. Not open to students with credit in STAT 502. Must be preceded by STAT 511.

Tests of hypotheses, estimation, analysis of variance, multiple regression and correlation, moments and frequency functions.

DEPARTMENT OF ENGINEERING TECHNOLOGY

Professor Rountree in charge

Architectural Engineering Technology

104. **PLAN READING.** Class 1, cr. 1.

Conventional representations as used in building trades, plans, and basic specifications: methods of showing plans, elevations, sections, and dimensions; symbols used to depict materials; definitions of common terms occurring on building plans; specifications as written for small buildings.

116. **ARCHITECTURAL DRAWING.** Lab. 6, cr. 2.

Introduction to architectural drawing, including use of instruments, lettering, orthographic projection, isometric views, and simple working drawings.

156. **FRAME CONSTRUCTION.** Class 1, Lab. 6, cr. 3. Must be preceded by BC 116.

Problems of wood frame structure, such as houses, details, and elementary design.

164. BUILDING MATERIALS. Class 3, cr. 3.
Properties and use of materials as found in building construction.

172. SYSTEMS OF CONSTRUCTION. Class 2. cr. 2.
Survey of different types of construction, including wood, steel, and reinforced concrete and curtain walls, considering the characteristics, advantages, and limitations.

204. BUILDING REGULATIONS. Class 2, cr. 2.
Building codes, ordinances, and regulations, with emphasis on those for structures in Indiana.

220. CONCRETE AND MASONRY CONSTRUCTION. Class 1, Lab. 6, cr. 3. Must be preceded by BC 116.
Preparation of drawings for light masonry structures, such as small buildings and stores; analysis of design, strength, and construction details.

236. ARCHITECTURAL PROJECTIONS. Lab. 6, cr. 2. Must be preceded by BC 156.
Introduction to projection, intersections, shading and shadows, and perspective drawing.

241. ARCHITECTURAL DESIGN I. Lab. 6, cr. 2. Must be preceded by BC 116 and BC 156.
Planning, development and architectural delineation of small structures; using pencil, charcoal and water color.

242. ARCHITECTURAL DESIGN II. Lab. 6, cr. 2. Must be preceded by BC 241.
Continuation of Architectural Design I with emphasis on large structures.

BC 248. HISTORY OF ARCHITECTURE I. Class 2, cr. 2.
Survey of the architectural periods, styles, and influence of cultures, which led to the development of architecture from earliest written historical times to the present day.

BC 249. HISTORY OF ARCHITECTURE II. Class 2, cr. 2. Must be preceded by BC 248.
Survey of architectural periods, styles and the influence of cultures which led to the development of architecture from the Romanesque period to the present day.

BC 256. STRUCTURAL DRAFTING. Class 1, Lab. 6, cr. 3. Must be preceded by BC 156 or 220, 236, and DM 212.
Detailing simple structural steel, reinforced concrete, and wood structures; elementary design principles.

BC 265. STRUCTURES I. Class 3, cr. 3. Must be preceded by DM 212 and Math 112.
Design of wood and steel frame structures.

BC 266. STRUCTURE II. Class 1, Lab. 6, cr. 3. Must be preceded by Structures I (BC 265).
Design of wood and steel trusses.

BC 276. SPECIFICATIONS AND CONTRACT DOCUMENTS. Class 2, cr. 2. Must be preceded by BC 156 and 220, and accompanied or preceded by English 421.
Preparation of general conditions and major phases of building construction specifications, study agreements, contracts, liens, and bonds.

BC 278. BUILDING CONSTRUCTION PRACTICES. Class 2, cr. 2. Must be preceded or accompanied by GN 268 and BC 276.
Extensive survey of busines practices and problems common to the construction industry.

BC 280. QUANTITY SURVEY. Class 2, Lab. 3, cr. 3. Must be preceded by BC 156 and BC 164.
Approximate and detailed methods of estimating materials and labor required to erect a building.

BC 284. MECHANICAL EQUIPMENT OF BUILDINGS. Class 2, cr. 2.
Survey course of the different types of systems and their applications.

BC 288. ELEMENTARY SURVEYING. Class 1, Lab. 3, cr. 2. Must be preceded by MA 112.
Plane surveying using 100-ft. steel tape, level, and transit.

BC 292. ESTIMATING. Class 3, cr. 3. Must be preceded by BC 156, 164 and 220.
Approximate and detailed methods of estimating materials and labor required to erect a building.

Chemical and Metallurgical Engineering Technology

CM 154. INDUSTRIAL CHEMISTRY. Class 3, Lab. 3, cr. 4. Must be preceded by MA 111 and PS 120.

Quantitative interpretations of chemical equations by numerical problems and practical application to industrial processes, using the principles of introductory chemistry.

CM 184. FERROUS METALLURGY. Class 3, cr. 3. Must be preceded or accompanied by CM 154.

Appliances and methods used in the reduction, refining, and shaping of ferrous alloys.

CM 212. INDUSTRIAL CHEMISTRY: QUALITATIVE. Class 1, Lab. 6, cr. 3. Must be preceded by PS 120 and MA 112.

Systematic semimicro analysis, with emphasis upon modern industrial techniques.

CM 228. PHYSICAL METALLURGY. Class 3, Lab. 3, cr. 4. Must be preceded by CM 184 or PS 176.

Basic principles: solid solutions, intermetallic compounds, equilibrium diagrams, plastic deformation, recrystallization and grain growth, heat treatment, and phase changes in the solid state.

CM 240. HEAT TRANSFER. Class 2, Lab. 3, cr. 3. Must be preceded by MA 112 and PS 176.

Fundamentals of heat transfer as applied to furnaces, heat exchanges, steam generators, cooling towers, evaporators, and distilling equipment.

CM 252. INDUSTRIAL CHEMISTRY: QUANTITATIVE. Class 1, Lab. 6, cr. 3. Must be preceded by CM 212.

An introduction to gravimetric, titrimetric, and potentiometric methods applicable to modern industrial practices.

CM 280. NONFERROUS METALLURGY. Class 2, cr. 2. Must be preceded or accompanied by CM 152.

Fundamentals of production metallurgy, with specific consideration of the methods employed in the reduction and refining of selected nonferrous metals.

CM 284. METALLOGRAPHY. Class 1, Lab. 6, cr. 3. Must be preceded by CM 228.

Preparation and microscopic examinations of metals.

Mechanical Engineering Technology

DM 156. GRAPHICAL COMPUTATIONS. Class 1, Lab. 6, cr. 3. Must be preceded by CES 110 and preceded or accompanied by MA 112.

Descriptive and analytic geometry principles applied to the solution of engineering problems; intersections and development of planes and solids; layout of objects in space; and determination of clearances between objects in space.

DM 180. MATERIALS AND PROCESSES. Class 3, cr. 3.

Application and characteristics, both physical and chemical, of the materials most commonly used in industry; the mechanical processes by which materials may be shaped or formed.

DM 200. POWER SYSTEMS. Class 3, cr. 3. Must be preceded by PS 136 and preceded or accompanied by DM 216.

A survey of steam and nuclear power plants, internal combustion engines, gas turbines, pumps, compressors, fans and blowers, refrigeration. Some theory in thermodynamics, combustion of fuels, heat transfer. Power generation and application to various fields with special mention of transportation.

DM 204. PRODUCTION DRAWING. Class 1, Lab. 6, cr. 3. Must be preceded by CES 110 and preceded or accompanied by DM 180.

Preparation of working drawings from layouts, drafting simplification, functional dimentioning, assembly drawings, detailing of machine elements, working with manufacturers' catalogs, applying fits, limits and tolerances to dimensions for interchangeable manufacture; information as to material, physical treatment, and manufacturing processes. The student works from layouts with a minimum of information so that self reliance in detailing may be developed.

DM 212. MECHANICS OF MATERIALS. Class 4, cr. 4. Must be preceded by PS 136 and preceded or accompanied by MA 112.

Forces acting on rigid bodies at rest and in motion-embracing vectors, force and moment laws of equilibrium for various force systems, centroids, center of gravity and moments of inertia, stress and strain, riveted and welded joints, torsion, shear, bending and deflection of beams, combined stresses and columns.

DM 216. MACHINE ELEMENTS. Class 3, cr. 3. Must be preceded by DM 204 and 212.

A survey of the more important elements used in tools and machines, and their general characteristics pertaining to application, operational behavior, efficiency, economy, and standardization.

DM 228. MACHINE DESIGN I. Class 1, Lab. 6, cr. 3. Must be preceded or accompanied by DM 216.

Practical applications in the design of machines and products utilizing mechanical, pneumatic, hydraulic and electrical operation and control.

DM 232. DYNAMICS AND MECHANISMS. Class 3, cr. 3. Must be preceded or accompanied by DM 216.

Basic fundamentals of mechanisms; linkages, motions in machines, and cams. Basic fundamentals of dynamics; displacement, velocities, accelerations, work, energy, power, impulse, momentum, and impact.

DM 236. JIG AND FIXTURE DESIGN. Class 1, Lab. 6, cr. 3. Must be preceded by DM 204.

Application of principles in the design and construction of drilling, milling, reaming and assembly jigs and fixtures; information related to materials, heat treatment and cost estimating. Gaging characteristics, selection and design for interchangeable manufacture.

DM 256. MATERIAL FABRICATION. Class 3, cr. 3. Must be preceded or accompanied by DM 180.

A study of the physical characteristics of metals and non-metals with respect to their behavior during fabrication; methods of material removal; elementary aspects of machine tool operation and tooling requirements.

DM 264. MACHINE DESIGN II. Class 1, Lab. 6, cr. 3. Must be preceded by DM 228 and DM 232.

Application of principles in the design and construction of machines and products. The assigned problems emphasize force analysis and strength calculations necessary for mechanical, hydraulic, pneumatic and electrical operation.

DM 288. DIE DESIGN. Class 1, Lab. 6, cr. 3. Must be preceded by DM 204.

Application of principles in the design and construction of piercing, blanking, forming, drawing dies; single combination compound and progressive type dies. Cam and assembly dies. Related information as to materials, heat treatment, and cost estimating.

DM 294. MECHANICAL ANALYSIS. Class 3, cr. 3. Must be preceded by DM 216 and DM 232.

A study of power transmission devices; mechanical, such as gears, bolt drivers, chain drives; pneumatic; and hydralic. Machine control devices; speed changers, clutches, brakes. General analysis of typical machines from the standpoint of force, strength, motion, efficiency, serviceability, function, economy, lubrication. Review and discussion of actual designs.

DM 296. MACHINE TOOL LABORATORY. Lab. 3, cr. 1. Must be preceded or accompanied by DM 180.

Two weeks' course consisting of 48 laboratory hours of instruction offered at the Lafayette campus on a full-time basis or on the eight Saturdays during the regular summer session.

To acquaint students with the uses and limitations of general purpose and production machines as well as with integrating processes of foundry welding, heat treating, and inspection into production planning.

DM 299. DRAFTING AND MECHANICAL TECHNOLOGY. Class 2, Lab. 3, cr. 2, or Class 4, Lab. 9, cr. 6. Fee will be charged at the rate of $15 per class hour and $4 per laboratory hour. Hours as arranged with staff.

Special studies in drafting and Mechanical Technology. Primarily for students who have completed most of the requirements for the Associate in Applied Science degree and desire to take an additional course in a specialized phase of Drafting and Mechanical Technology.

Electrical Engineering Technology

ET 104. ELECTRONICS I—CIRCUITS. Class 3, Lab. 3, cr. 4. Must be preceded or accompanied by PS 176 and MA 111.

A study of the principles of operation and industrial applications of the more common types of vacuum and gas tubes, photo-electric cells, and cathode ray tubes. The simple basic circuits using these tubes are studied and their applications emphaized.

ET 156. ELECTRONICS II—SEMI-CONDUCTORS; TRANSISTORS. Class 2, Lab. 3, cr. 3. Must be preceded by ET 104 and preceded or accompanied by ET 176.

A study of the theory and application of transistors and other semi-conductors, with emphasis placed upon practical uses of these devices in industrial and communication circuits, including study of crystal diodes as detectors, diode power applications, and applications of transistors.

ET 176. ELECTRICAL CIRCUITS. Class 3, Lab. 3, cr. 4. Must be preceded or accompanied by MA 112, and ET 104.

Nature of direct and alternating current electricity and practical applications of theory to concepts involving: resistance, simple circuits, power, power factors, reactance, impedance, simple DC and AC circuit calculations, and complex notation.

ET 208. AC AND DC MACHINES AND CONTROLS. Class 2, cr. 2. Must be preceded by ET 176.

The elementary study of AC and DC machines and their controls. This includes accelerating relays, protective relays, circuit breakers, controllers, and contractors.

ET 212. ELECTRICAL MACHINES. Class 4, Lab. 3, cr. 5. Must be preceded by ET 176.

Particular emphasis is placed on operational theory and application of both AC and DC machines in industry. Transformers and their roles in industry are studied, and industrial electrical systems are analyzed.

ET 216. ELECTRICAL MACHINES AND CONTROLS. Class 3, cr. 3. Must be preceded by MA 112 and PS 176 or equivalent.

Lecture, recitation and demonstration are combined to acquaint the student with the elements of electrical circuits and machines as they are applied as component parts of machine drives and controls within the requirements of the National Electrical Code and in conformity to the ratings and dimensional specifications of NEMA. Manufacturers catalogs and pamphlets are used freely as classroom aids.

ET 224. FUNDAMENTALS OF TELEVISION. Class 2, cr. 2. Must be preceded or accompanied by ET 236.

Principles of television transmission and receiver systems, frequency modulation, and standards set by the Federal Communications Commision.

ET 228. POWER DISTRIBUTION. Class 2, cr. 2. Must be preceded or accompanied by ET 212.

A study of the equipment used in transmission and distribution of electrical energy from generating station to consumer, including overhead and underground circuits, high and low voltage circuits, overload and short circuits, and indoor and outdoor lighting.

ET 236. ELECTRONICS III—RADIO CIRCUITS. Class 4, Lab. 3, cr. 5. Must be preceded by ET 156 and ET 176.

Structural details and elementary principles of operation of rectifiers, amplifiers of various types, modulation, demodulation, receivers and their characteristics.

ET 252. ELECTRIC POWER BLUEPRINTS AND DIAGRAMS. Class 1, Lab. 3, cr. 2. Must be preceded by CES 110, and preceded or accompanied by ET 268.

A practical study of symbols and standards used on electrical blueprints and writing diagrams primarily for control circuits.

ET 256. ELECTRONICS IV—TRANSMITTERS. Class 2, Lab. 3, cr. 3. Must be preceded by ET 236.

The study of transmitters, special circuits for wave shaping, filters, UHF, and transmission lines as used in UHF.

ET 257. ELECTRONICS IV—TRANSMITTERS. Class 3, cr. 3. Must be preceded by ET 236.

The study of transmitters, special circuits for wave shaping, filters, UHF, and transmision lines as used in UHF.

ET 264. ELECTRICAL MEASUREMENTS. Class 3, Lab. 3, cr. 4. Must be preceded by ET 176.

A study of the principles of operation and the construction of direct and alternating current measuring instruments. Careful consideration is given to the choice of the best instruments, their possible errors, the means of calibration, and their correct use in industrial situations.

ET 268. CONTROL OF ELECTRIC MOTORS. Class 4, cr. 4. Must be preceded or accompanied by ET 212.

Accelerating relays, protective relays, circuit breakers, controllers, and contractors used in industry are studied. Circuit diagrams for starting, accelerating, and regulating industrial drives are thoroughly analyzed. Controls for adjustable voltage systems are discussed. Dynamic crane and traction controls are included in this course.

ET 272. AUTOMATION AND ELECTRONIC CONTROL. Class 4, Lab. 3, cr. 5. Must be preceded by ET 212 or 208 and by ET 236 for option C. A study of automatic control devices. Included are application of automatic feedback and regulating systems. Induction heating, resistance welding, process timing, motor controls, and associated circuits are also examined.

Industrial Engineering Technology

UNDERGRADUATE LEVEL

Lower-Division Courses

IT 104. INDUSTRIAL ORGANIZATION AND PRODUCTION. Class 4, cr. 4.

A detailed survey of organizational structures; operational, financial, marketing, and accounting activities; duties of management, planning, control, personnel, safety, wages, policy, and human factors necessary for effective management.

IT 105. INDUSTRIAL ORGANIZATION AND PRODUCTION I. Class 2, cr. 2.

Survey of organizational structures; operational, financial, marketing, and accounting activities; and human factors necessary for effective management of a small business. (First half of IT 104.)

IT 152. HUMAN RELATIONS IN INDUSTRY. Class 3, cr. 3.

Study of the bases of human relations and the organization of individual and group behavior. Special emphasis on typical industrial and business relationships in everyday situations. Examines fundamental relationships between behavior and personal and group forces.

IT 204. TECHNIQUES OF MAINTAINING QUALITY. Class 2, Lab. 3, cr. 3. Must be preceded by IT 104 and preceded or accompanied by MA 112.

An analysis of the basic principles of inspection and the study of the various techniques and types of equipment connected with inspection processes. Includes methods of using mechanical, electronic, air and light devices for checking and measuring and other related techniques to determine quality levels of acceptance.

IT 212. INDUSTRIAL SAFETY. Class 2, cr. 2. Must be preceded by IT 104.

Safety fundamentals as related to the economics of accident prevention, analysis of accident causes, mechanical safeguards, fire prevention, plant housekeeping, occupational diseases, first aid, safety organization, protective equipment, and the promotion of safe practices.

IT 224. PRODUCTION PLANNING AND CONTROL. Class 3, Lab. 3, cr. 4. Must be preceded by DM 180 and IT 152.

Preproduction planning of the most economical methods, machines, operations, and materials for the manufacture of a product. The planning, scheduling, routing, and detailed procedure of production control.

IT 227. PRODUCTION PLANNING AND CONTROL. Class 3, cr. 3. Must be preceded by DM 180 and IT 152.

Preproduction planning of the most economical methods, machines, operations, and materials for the manufacture of a product. The planning, scheduling, routing, and detailed procedure of production control. (Same as IT 224 without laboratory.)

IT 244. FUNDAMENTALS OF PRODUCTION COST. Class 1, Lab. 3, cr. 2. Must be preceded by IT 104.

Fundamental mechanics (rules for debit and credit) of accounting, principles of account classification, business forms and procedures, financial and operating statements, and elements of cost accounting—all from the viewpoint of industrial organization.

IT 248. PRODUCTION COST ANALYSIS. Class 1, Lab. 3, cr. 2. Must be preceded by IT 244.

Specific applications of production cost theories to principles developed through study of selected case problems.

IT 260. MOTION AND TIME STUDY. Class 2, Lab. 3, cr. 3. Must be preceded by IT 152, DM 180, and MA 112.

Techniques of motion and time study, process charts, operation charts, multiple activity charts, micromotion study, therbligs, and stop-watch time study.

IT 268. PLANT LAYOUT. Class 2, Lab. 3, cr. 3. Must be preceded by CES 110, IT 224 and 260.

Arrangement of stock, machines, layout of aisles, and use of space, and material handling for the highest efficiency of production.

IT 272. JOB EVALUATION. Class 2, cr. 2. Must be preceded by IT 152 and MA 112.

A survey of the basic principles and significance of job evaluation. An analysis of current practices and techniques used in job analysis, job descriptions, and job evaluation.

IT 280. WAGE INCENTIVES. Class 2, cr. 2. Must be preceded by IT 260 and 272.

An analysis and study of various types of wage incentive plans, their significance, adaptability, effectivenes, and equitability. A systematic appraisal of the basic objectives and currrently used techniques in the administration of wage incentive programs.

IT 296. INDUSTRIAL TECHNOLOGY CASE PROBLEMS. Class 2, cr. 2.

Application of theories developed in the several industrial technology courses to selected general case problems—to provide practice in the integration of principles.

UNDERGRADUATE LEVEL

Upper-Division Courses

IT 312. MATERIALS HANDLING. Class 3, cr. 3. Must be preceded by IT 104.

A survey of materials handling elements, the unit load, packaging, bulk handling, the economics of materials handling, improving existing handling methods, justification for handling equipment, special handling techniques, and the management of the materials handling divisions in the industrial organization.

IT 324. PRODUCTION TECHNIQUES. Class 3, cr. 3. Must be preceded by IT 224.

Continuation of operation planning with emphasis upon the equipment, tools, and techniques used in mass production. Adaptation of proposed plans to conform to existing facilities.

IT 340. COST CONTROL. Class 3, cr. 3.

Standard costs, estimating costs, distribution costs, various systems of cost accounting.

IT 356. PERSONNEL PROBLEMS IN INDUSTRY. Class 2, cr. 2. Must be preceded by IT 152.

Analysis of selected case problems, with emphasis on attitudes, philosophies, and responsibilities of supervisory personnel in relationship to the worker.

IT 360. ADVANCED MOTION AND TIME STUDY. Class 3, Lab. 3, cr. 4. Must be preceded by IT 260.

Operation analysis, micromotion study, simo and possibility charts, standard data, and formula construction.

IT 368. LEGISLATION AFFECTING INDUSTRIAL RELATIONS. Class 4, cr. 4.

Wage contracts and payments, workmen's compensation and insurance, injunction, strikes and boycotts, and statutes affecting labor.

IT 396. INDUSTRIAL TECHNOLOGY. cr. 1 to 7.

Fee will be charged at the rate of $15 per class hour and $4 per laboratory hour. Hours as arranged with staff. Primarily for students who have completed the requirements for the Diploma in Applied Technology. Special studies in industrial technology.

General Studies

GN 100. TECHNICAL INSTITUTE ORIENTATION LECTURES. Class 1, cr. 1. Required for all full-time students and must be taken first semester of enrollment.

The organization and services of the university related to the student. The relationships of the engineers, technicians, and tradesmen to one another and to industry. The development and function of the technical institutes and of the separate technologies. Guidance in adapting to the university and preparation for industrial jobs.

GN 204. FUNDAMENTALS OF PRACTICAL SPEAKING. Class 2, cr. 2.

Organization and presentation of material, voice and physical delivery, audience reaction.

GN 220. TECHNICAL REPORT WRITING. Class 3, cr. 3.

Extensive application of the principles of good writing in industrial reporting, with emphasis on the techniques of presenting information graphically as well as in a clear, concise written form.

GN 232. DEMOCRATIC GOVERNMENT. Class 2, cr. 2.

A study of the development of democratic government in the U.S. and other democratic areas of the world.

GN 240. LABOR RELATIONS PROBLEMS. Class 3, cr. 3.

Problems of workers with possible solutions as suggested by organized labor and management. Regulations concerning management, labor, the collective bargaining agreement, grievance and arbitration procedures.

GN 260. ECONOMICS OF INDUSTRY. Class 2, cr. 2.

Fundamental economics principles which affect everyone, with particular emphasis upon their application to industry.

GN 264. CONFERENCE SPEAKING. Class 2, cr. 2. Must be preceded by GN 204.

Training and practice in conducting and participating in small group conferences, shop committees, instructional groups, problem-solving groups.

GN 268. ELEMENTS OF LAW. Class 3, cr. 3.

An introductory law course, with a brief comparison of the American federal system and the parliamentary system of government; and covering law, with emphasis on judicial review, court jurisdiction, and procedure generally and basic law in particular.

Physical Sciences

PS 120. INTRODUCTION TO CHEMISTRY. Class 2, Lab. 3, cr. 3. Must be preceded or accompanied by MA 111.

The general basic principles of chemistry, including a study of important elements and their simpler compounds. Special emphasis is placed on industrial applications.

PS 136. PHYSICS: MECHANICS AND HEAT. Lect. 2, Rec. 2, Lab. 2, cr. 4. Must be preceded or accompanied by MA 111.

Work, energy, power, efficiency of simple machines; equilibrium conditions for soilds, liquids, and gases; straight line and rotational motion—uniform and accelerated motion. Elementary principles of heat and their technical applications.

PS 176. PHYSICS: ELECTRICITY, SOUND, AND LIGHT. Lect. 2, Rec. 2, Lab. 2, cr. 4. Must be preceded by PS 136, except ET students.

Fundamental principles of electricity, wave emotion, sound, and light.

PS 204. FUNDAMENTALS OF QUALITY CONTROL. Class 2, cr. 2. Must be preceded by MA 111 and 112.

Frequency distributions, normal curve, average standard deviation, standard error of the mean, x and R charts, "u" chart, rational sub-group, statistical aspects of tolerances, and the basic concepts of probability.

PS 284. INSTRUMENTATION. Class 2, Lab. 3, cr. 3.

Basic principles of instruments selected. Care and use as found in industry for physical measurement.

PS 324. ADVANCED TOPICS IN QUALITY CONTROL I. Class 2, cr. 2. Must be preceded by PS 204.

Sampling plans including Dodge Romig, MIL, Std. 105 and sequential, line of best fit, grouped and ungrouped linear correlation, standard error of the estimate, and significance of differences.

PS 364. ADVANCED TOPICS IN QUALITY CONTROL II. Class 2, cr. 2. Must be preceded by PS 204 and preceded or accompanied by PS 324. Confidence limits, analysis of variance, multiple correlation, chi square applications, and curve fitting.

SCHOOL OF SCIENCE, EDUCATION, AND HUMANITIES

DEPARTMENT OF BIOLOGICAL SCIENCES

Professor Koffler in charge

General Biology

103. PRINCIPLES OF BIOLOGY. Sem. 1. Class 2, Lab. 2, cr. 3.

The nature of the living state, and experimental approaches in studying it. Required for majors in the department. Together with BIO 104 satisfies the biology requirement for bachelor's degree in the School of Science, Education and Humanities.

104 PRINCIPLES OF BIOLOGY. Sem. 2. Class 2, Lab. 2, cr. 3.

Continuation of BIO 103.

108 INTRODUCTION TO BOTANY. Sem. 1 and 2. Class 3, Lab. 3, cr. 4. (1 A, 3 P, el. S).

Introduction to the growth, functioning, structures, heredity, diversity of plants, and their interactions with the environment.

109. INTRODUCTION TO ZOOLOGY. Sem. 1 and 2. Class 2, Lab. 4, cr. 4. (1 A, 3 P, el. S).

Introduction to the structure, functioning, heredity, development, classification, and evolution of animals, and their interactions with the environment.

203. **BIOLOGY OF MAN.** Sem. 2. Class 2, cr. 2.

Continuation of BIO 201 (ZOOL 260, 360).

204. **LABORATORY IN HUMAN BIOLOGY.** Sem. 2, Lab. 2, cr. 1. (4 H, 4 PEM, 4 PEW, el. S).

Must be accompanied by BIO 203 (ZOOL 260, 360).

205. **BIOLOGY FOR ELEMENTARY SCHOOL TEACHERS.** Sem. 1. Class 2, Lab. 2, cr. 3.

Introduction to biology applicable to teaching in the elementary schools, including aspects of conservation, safety, nutrition, personal and public health.

206. **BIOLOGY FOR ELEMENTARY SCHOOL TEACHERS.** Sem. 2. Class 2, Lab. 2, cr. 3.

Continuation of BIO 205 (BIO 205).

220. **INTRODUCTION TO MICROBIOLOGY.** Sem. 2. Class 2, Lab. 2, cr. 3. (6 H, el. S). (When offered through the University centers: Class 2, Lab. 2, cr. 3). Must be preceded by one year of general chemistry and one semester of a life science.

The isolation, growth, structure, functioning, heredity, identification, classification, and ecology of microorganisms, their role in nature and significance to man.

221. **INTRODUCTION TO MICROBIOLOGY.** Sec. 1 and 2. Class 2, Lab. 4, cr. 4. (3 A, 5 H, 5 P, el. 5 CE, S). Must be preceded by one year of general chemistry and one semester of a life science.

The isolation, growth, structure, functioning, heredity, identification, classification, and ecology of microorganisms, their role in nature and significance to man.

260. **STRUCTURAL BIOLOGY.** Sem. 2. Class 2, Lab. 4, cr. 4. Must be preceded by BIO 104 or equivalent.

Structure of plants and animals, with emphasis on functional and phylogenetic relationships.

DEPARTMENT OF CHEMISTRY

Professor McBee in charge

100. **ELEMENTARY CHEMISTRY.** Sem. 1. Class 3, cr. 3.

Does not carry credit toward graduation in the schools of Engineering and Science, Education, and Humanities. Does not serve as a prerequisite to CHM 108, 110, 112, or 114.

An introductory chemistry course.

109. **GENERAL CHEMISTRY.** Sem. 1. Class 3, Lab. 3, cr. 4. (op. 1 S).

Required for all freshmen in the prepharmacy option of the School of Science, Education, and Humanities.

110. **GENERAL CHEMISTRY WITH QUALITATIVE ANALYSIS.** Sem. 2. Class 2, Lab. 6, cr. 4. (op. 2 S).

Continuation of CHM 109 with laboratory work in qualitative analysis.

111. **GENERAL CHEMISTRY.** Sem. 1 and 2. Class 2, Lab. 3, cr. 3. (1 A, 5 IED, el. H, op. 1 S).

Required for all freshmen registered in the School of Agriculture or in biology options of the School of Science, Education, and Humanities who are not in CHM 115 or 117.

112. **GENERAL CHEMISTRY.** Sem. 1 and 2. SS. Class 2, Lab. 3, cr. 3. (2 A, 6 IED, el. H, op. 2 S).

Continuation of CHM III.

115. **GENERAL CHEMISTRY.** Sem. 1 and 2. SS. Class 3, Lab. 3, cr. 4. (1 ENGR, IED, op. 1 A, S).

Required of students majoring in chemistry, physics, and engineering who do not take CHM 117-126.

Laws and principles of chemistry, with special emphasis on topics of importance in engineering. Numerical problems and relationships are introduced whenever quantitative treatment is possible.

116. **GENERAL CHEMISTRY.** Sem. 1 and 2. SS. Class 3, Lab. 3, cr. 4. (2 ENGR, IED, op. 2 A, S).

A continuation of CHM 115.

117. **ADVANCED GENERAL CHEMISTRY.** Sem. 1. Class 4, Lab. 3, cr. 5. (Freshmen).

Prerequisites: Satisfactory record of one year of high school chemistry and suitable standing on orientation test.

120. GENERAL CHEMISTRY. Sem. 1. Class 1, Lab. 3, cr. 2. (op. ENGR, A, S). Must be preceded by CHM 116.

Required of students who have completed CHM 115 and CHM 116 and who are planning to take CHM 573. A consideration of certain principles of general and analytical chemistry which are not covered in CHM 115 and CHM 116. Effective second semester, 1961-62. This course is designed to bridge the gap between the course sequences 115-116 and 117-126.

126. ADVANCED GENERAL CHEMISTRY WITH QUALITATIVE ANALYSIS. Sem. 2. Class 3, Lab. 6, cr. 5. (op. 2 Freshmen).

Continuation of CHM 117 with laboratory work in qualitative analysis.

255. ORGANIC CHEMISTRY. Sem. 1. Class 3, cr. 3. (op. H, el. S). Must be preceded by CHM 108, 110, 112, 116 or 118.

255L. ORGANIC CHEMISTRY LABORATORY. Sem. 1, Lab. 3, cr. 1. (op. H, el. S).

Laboratory experiments to accompany CHM 255.

256. ORGANIC CHEMISTRY. Sem. 2. Class 3, cr. 3. (op. H, el. S).

Continuation of CHM 255.

256L. ORGANIC CHEMISTRY LABORATORY. Sem. 2. Lab. 3, cr. 1. (op. H, el. S).

Laboratory experiments to accompany CHM 256.

261. ORGANIC CHEMISTRY. Sem. 1. Class 2, Lab. 6, cr. 4. (3 CHE, el. A, H, S). Must be preceded by CHM 126 or CHM 120 or else taken concurrently with CHM 120.

An introductory course covering aliphatic and alicyclic compounds. Required of students majoring in chemistry. Effective first semester, 1961-1962.

262. ORGANIC CHEMISTRY. Sem. 2. Class 2, Lab. 6, cr. 4. (4 CHE, el. A, H, S). Must be preceded by CHM 261. A continuation of CHM 261 covering aromatic compounds and selected topics. Required of students majoring in chemistry. Effective second semester, 1961-62.

373. PHYSICAL CHEMISTRY. Sem. 1 and 2. SS. Class 3, cr. 3. Must be preceded by CHM 120 or 126, MA 261, and two semesters of college physics.

Constitution of matter; general properties of gases, liquids, and solids; phenomena of solutions; special topics of electro-chemistry, thermodynamics, thermochemistry, chemical statics and dynamics, chemical equilibrium, and the phase rule.

EDUCATION

Professor Alexander in charge

285. EDUCATIONAL PSYCHOLOGY. Sem. 1 and 2. SS. Class 3, cr. 3. (4 H, IED, PEM, op. 4 S, 6 A). Must be preceded by PSY 120.

An introduction to the application of psychology to education, with particular emphasis on human development and learning.

UNDERGRADUATE LEVEL
Upper-Division Courses

304. PRINCIPLES OF TEACHING. Sem. 1 and 2. SS. Class 2 or 3, cr. 2 or 3. Must be preceded by PSY 120.

Fundamental principles underlying classroom instruction and management, including consideration of pupil behavior, counseling, and remedial techniques.

DUAL LEVEL—UNDERGRADUATE AND GRADUATE

500. AUDIO-VISUAL AIDS FOR TEACHERS. Sem. 1 and 2. SS. cr. 2 or 3. Must be preceded by 12 hours of education and psychology.

Sources, selection, and effective use of audio-visual aids and preparation of audio-visual materials.

504. INTRODUCTION TO MEASUREMENT AND EVALUATION. Sem. 1 and 2. SS. Class 2, Lab. 2, cr. 3.

An introduction to the basic concepts and principles of management and evaluation with special emphasis on descriptive statistics, and on teacher-made and standardized tests.

518. EDUCATIONAL PROBLEMS OF TEACHERS. SS. cr. 1 to 4.

Primarily for experienced teachers desiring credit from special workshops or individual study. Topics of individual study will deal with problems which arise from the professional work of classroom teachers.

530. ADVANCED EDUCATIONAL PSYCHOLOGY. Sem. 1. SS. Class 3, cr. 3 (el.). Must be preceded by PSY 120 and ED 285.

Principles of learning evaluated in relation to current methods of instruction and to the result from research in education and psychology.

580. LIBRARY MATERIALS FOR CHILDREN. Sem. 2. SS. Class 3, cr. 3. Must be preceded by five hours of education and psychology.

The selection and use of library materials for children.

DEPARTMENT OF ENGLISH

Professor Cosper in charge

101. **ENGLISH COMPOSITION I.** Class 3, cr. 3. Prerequisite to all courses in English except ENGL 2, 3, 103, and 185.

Purpose: to develop competence in written expression through directed practice in writing. Emphasis on problems of mechanics and organization.

103. **ENGLISH COMPOSITION.** Sem. 1 and 2. SS. Class 3, cr. 3. (Freshmen).

A composition course for freshmen provisionally excused from ENGL 101 on the basis of orientation tests. The course attempts to develop writing on a high critical level, improve reading tastes, and arouse an interest in the humanities and conflicting intellectual attitudes. Credit in the course may not be established by examination.

185. **DEVELOPMENTAL READING.** Lab. 2, cr. 1.

Purpose: to increase reading efficiency by improving comprehension and by developing the motor skills involved in reading speed. Motivates reading interest through use of films and pacers.

202. **ENGLISH COMPOSITION II.** Class 3, cr. 3. The second half of the basic composition course. Emphasis on problems of diction and logical analysis.

A student who has received a grade of A in ENGL 101 may, with the approval of the head of his school, substitute for ENGL 202 an elective course in English.

230. **INTRODUCTION TO LITERATURE.** Class 3, cr. 3. Not open to students with credit for ENGL 238.

Reading and discussion of major works in English, American, and continental literature to develop an understanding of style, form, and ideas characteristic of great works. Emphasis on types of narrative literature.

With ENGL 231 it satisfies literature requirement of School of Science, Education, and Humanities.

231. **INTRODUCTION TO LITERATURE.** Class 3, cr. 3.

Reading and discussion of major works in English, American, and continental literature to develop an understanding of style, form, and ideas characteristic of great works. Emphasis on various types of literature.

238. **INTRODUCTION TO FICTION.** Class 3, cr. 3. Not open to students with credit for ENGL 230.

Reading and discussion of selected short stories and seven novels, to promote awareness, understanding, and appreciation of the range, values, techniques, and meanings of reputable modern fiction.

240. **INTRODUCTION TO THE LITERATURE OF ENGLAND: FROM THE BEGINNINGS TO SWIFT AND POPE.** Sem. 1 and 2. SS. Class 3, cr. 3.

A survey with emphasis on the study of selected texts from the major writers, this course aims at both competence in literary analysis and awareness of the relation between each writer and his times. Required of all students majoring in English.

241. **INTRODUCTION TO THE LITERATURE OF ENGLAND: FROM THE RISE OF ROMANTICISM TO THE TWENTIETH CENTURY.** Sem. 1 and 2. SS. Class 3, cr. 3.

A continuation of ENGL 240, this course carries the same study from the mid-eighteenth to the twentieth century.

Required of all students majoring in literature.

250. **GREAT AMERICAN BOOKS.** Class 3, cr. 3.

Seven books, such as *The Scarlet Letter, Moby Dick,* and *Walden,* read and discussed as to their literary qualities and their cultural significance.

456. **AMERICAN HUMOR.** Sem. 2. Class 3, cr. 3.

Humorous writings of the nineteenth and twentieth century are studied as to form and technique and also as a reflection of American life. Special emphasis on Mark Twain.

DUAL LEVEL—UNDERGRADUATE AND GRADUATE

555. **MAIN CURRENTS OF AMERICAN THOUGHT.** Sem. 2. Class 3, cr. 3.

A survey of dominant ideas and intellectual trends in America from 1607 to the present as revealed through American literature and as related to American life and culture.

578. **MODERN AMERICAN FICTION.** Sem. 2. Class 3, cr. 3.

Critical study of twentieth-century novels and short stores, including works by such writers as James Faulkner, and Hemingway.

GENERAL STUDIES, INTEGRATED STUDIES, AESTHETICS

370. MUSIC FOR THE LISTENER. Sem. 1 and 2. SS. Class 3, cr. 3. (el.). Introductory nontechnical study of forms of serious music.

May be applied toward meeting the aesthetics requirement of the School of Science, Education, and Humanities.

DEPARTMENT OF HISTORY, GOVERNMENT, AND PHILOSOPHY

Professor Forster in charge

History

200. EARLY CIVILIZATION. Sem. 1 and 2. SS. Class 3, cr. 3. (el.).

A survey of European development from earliest times through the sixteenth century, this course is designed to meet the needs of the beginning student in European and world history.

201. DEVELOPMENT OF MODERN CIVILIZATION. Class 3, cr. 3.

A continuation of HIST 200, this course traces the expansion of Europe into the Americas, Africa, and Asia. The French Revolution, nationalism, and the development of Western European states from the sixteenth century to the present are studied.

251. AMERICAN HISTORY TO 1865. Class 3, cr. 3.

A study of the development of American political, economic, and social institutions from the early explorations and colonial settlements to the conclusion of the Civil War.

252. THE UNITED STATES AND ITS PLACE IN WORLD AFFAIRS. Class 3, cr. 3.

A study of the growth of the United States from the period of the Reconstruction to the present. The new industrialism, agrarian problems, territorial expansion, the two world wars, depression, the New Deal, and similar topics are analyzed.

415. HISTORY OF EUROPE SINCE 1914. Sem. 2. Class 3, cr. 3. (el.).

A survey of the causes, campaigns, and diplomacy of World War I; post war adjustments and the inter-war period; the causes, campaigns, and diplomacy of World War II, and a survey of each of the major countries since 1945.

DUAL LEVEL—UNDERGRADUATE AND GRADUATE

565. THE CIVIL WAR AND RECONSTRUCTION (1850 to 1877). Sem. 2. Class 3, cr. 3. (el.). Must be preceded by HIST 204 and 205 or GS 131 and 132 or by consent of the instructor.

A survey of the American Civil War and Reconstruction, covering the intense sectional conflict of the 1850s; the military, social, economic, and political aspects of the war; and the political and economic reconstruction which followed.

584. SOCIAL HISTORY OF THE UNITED STATES. Sem. 1. Class 3, cr. 3. (el.).

A survey of the social and cultural development of the American people since the late eighteenth century.

Government

101. INTRODUCTION TO GOVERNMENT. Class 3, cr. 3.

The problems of government as illustrated by American national government. Attention to political theory as well as to the organization and problems of government.

102. INTRODUCTION TO GOVERNMENT. Sem. 1 and 2. Class 3, cr. 3. (el. 2, 3, 4). Must be preceded by GVMT 101.

State and local government: powers, relationships, and problems of administration, with emphasis on the Middle Western States.

331. INTERNATIONAL RELATIONS. Sem. 1 and 2. SS. Class 3, cr. 3. (el.).

Introductory survey of the underlying forces in international relations, the foreign policies of the great powers, and agencies of control and cooperation.

Philosophy

210. **INTRODUCTION TO PHILOSOPHY.** Sem. 1 and 2. Class 3, cr. 3.

The basic problems and types of philosophy, with special emphasis upon the problem of knowledge and nature of reality.

May be applied toward meeting the philosophy requirement of the School of Science, Education, and Humanities. Staff.

211. **ETHICS.** Sem. 1 and 2. Class 3, cr. 3.

An examination of the nature of moral values and a brief consideration of the basic problems involved in the philosophy of art. May be applied toward meeting the philosophy requirement of the School of Science, Education, and Humanities.

250. **PRINCIPLES OF LOGIC.** Class 3, cr. 3.

The theory and practice of deductive reasoning; immediate inference, the syllogism, hypothetical and disjunctive inference. Particular attention to semantic fallacies as embodied in current literature.

DEPARTMENT OF MODERN LANGUAGES

Professor Walther in charge

French

101. **FIRST COURSE IN FRENCH.** Class 2, Lab. 2, cr. 3. For beginners only.

Unless recommended by the head of the school in which the student is registered, a student may not apply toward graduation the credit for FR 101 without satisfactorily completing a more advanced course in French.

102. **SECOND COURSE IN FRENCH.** Class 2, Lab. 2, cr. 3. Must be preceded by FR 101 or equivalent.

Continuation of FR 101.

203. **THIRD COURSE IN FRENCH.** Class 3, cr. 3 (op. or el.). Must be preceded by FR 102 or equivalent.

Readings from works of modern and contemporary French writers; practice in speaking and writing French.

204. **FOURTH COURSE IN FRENCH.** Class 3, cr. 3 (op. or el.). Must be preceded by FR 203 or equivalent.

Continuation of FR 203.

German

101. **FIRST COURSE IN GERMAN.** Class 2, Lab. 2, cr. 3. For beginners only.

Unless recommended by the head of the school in which the student is registered, a student may not apply toward graduation the credit for GER 101 without satisfactorily completing a more advanced course in German.

102. **SECOND COURSE IN GERMAN.** Class 2, Lab. 2, cr. 3. Must be preceded by GER 101 or equivalent.

Continuation of GER 101.

203. **THIRD COURSE IN GERMAN.** Class 3, cr. 3 (op. or el.). Must be preceded by GER 102 or equivalent.

Readings from the works of nineteenth century and contemporary German writers; practice in speaking and writing German.

204. **FOURTH COURSE IN GERMAN.** Class 3, cr. 3 (op. or el.). Must be preceded by GER 203 or equivalent.

Russian

UNDERGRADUATE LEVEL

Lower-Division Courses

101. **FIRST COURSE IN STANDARD RUSSIAN.** Class 2, Lab. 2, cr. 3. (op. or el.). For beginners only.

Unless recommended by the head of the school in which the student is registered, a student may not apply toward graduation the credit for RUSS 101 without satisfactorily completing a more advanced course in Rusian.

102. **SECOND COURSE IN STANDARD RUSSIAN.** Class 2, Lab. 2, cr. 3. (op. or el.). Must be preceded by RUSS 101 or equivalent.

Continuation of RUSS 101.

203. **THIRD COURSE IN STANDARD RUSSIAN.** Class 3, cr. 3. (op. or el.). Must be preceded by RUSS 102 or equivalent.

204. **FOURTH COURSE IN STANDARD RUSSIAN.** Class 3, cr. 3. (op. or el.). Must be preceded by RUSS 203 or equivalent.

Continuation of RUSS 203.

Spanish

101. **FIRST COURSE IN SPANISH.** Class 2, Lab. 2, cr. 3. (op. or el.).

For students who have had no previous work in Spanish.

102. **SECOND COURSE IN SPANISH.** Class 2, Lab. 2, cr. 3. (op. or el.). Must be preceded by SPAN 101 or equivalent.

203. THIRD COURSE IN SPANISH. Class 3, cr. 3. (op. or el.). Must be preceded by SPAN 102 or equivalent.

Readings from the works of nineteenth century and contemporary Spanish writers; practice in speaking and writing Spanish.

204. FOURTH COURSE IN SPANISH (READING). Sem. 1 and 2. Class 3, cr. 3. (op. or el.). Must be preceded by SPAN 203 or equivalent.

Primary emphasis on reading, but some practice in speaking.

PHYSICAL EDUCATION FOR MEN

Professor Mackey, Head of Department
Professor France, Associate Head

UNDERGRADUATE LEVEL

Lower-Division Courses

103. PHYSICAL EDUCATION CURRICULAR ACTIVITIES. Sem. 1 and 2. Class 1, Lab. 4, cr. 3. (1 PEM, el. 3 S).

Theory and skill techniques in gymnastics, soccer, tennis, handball, and squash.

104. PHYSICAL EDUCATION CURRICULAR ACTIVITIES. Sem. 1 and 2. Class 1, Lab. 4, cr. 3. (2 PEM, el. 4 S).

Theory and skill techniques in apparatus, tumbling, golf, volleyball, and badminton.

105. PHYSICAL EDUCATION: ORIENTATION AND HISTORY. Sem. 1 and 2. Class 2, cr. 2. Not open to students who have credit in PEMN 101 or 102.

112. PHYSICAL ACTIVITIES. Lab. 3, cr. 1. (el.).

151. SPORTS OFFICIATING. Sem. 1. Class 1, Lab. 3, cr. 2. (el.).

Principles of officiating.

204. PHYSICAL EDUCATION RHYTHMIC ACTIVITIES. Sem. 2. Class 1, Lab. 2, cr. 2. (4 PEM, el. S).

Theory and skill techniques in group games, dancing, and other social activities.

205. PHYSICAL EDUCATION CURRICULAR ACTIVITIES. Sem. 1. Class 1, Lab. 4, cr. 3.

206. PHYSICAL EDUCATION CURRICULAR ACTIVITIES. Sem. 2. Class 1, Lab. 4, cr. 3.

307. PRINCIPLES OF COACHING BASKETBALL AND TRACK. Sem. 1. Class 1, Lab. 4, cr. 3.

380. FIRST AID AND SAFETY. Sem. 1 and 2. Class 1. Lab. 2, cr. 2. (el.). For three credits see PEW 380.

PHYSICAL EDUCATION FOR WOMEN

Professor Hazelton in charge

UNDERGRADUATE LEVEL

Lower-Division Courses

100. PHYSICAL EDUCATION. Sem. 1 and 2. Lab. 2, cr. 1. (Freshmen, Sophomores.)

A wide range of activities at varying levels of ability designed to develop recreational skills and interests and to contribute to the maintenance of physical well-being. Required of freshman and sophomore women for four semesters.

103. PERSONAL HYGIENE.* Sem. 1 and 2. Class 1, cr. 1. (Freshmen.)

Required for one semester of all freshman women and entering sophomores (sophomore 3) who do not have credit for an equivalent course. Orientation to health problems in college.

DEPARTMENT OF PHYSICS

Professor James in charge

152. MECHANICS AND SOUND. Class 3, Lect.-Dem. 1, Lab. 2, cr. 4. Must be preceded or accompanied by MA 162.

Statics; uniform and accelerated motion; Newton's laws; circular motion; energy, momentum, and conservation principles; dynamics of rotation; gravitation and planetary motion; elasticity; simple harmonic and wave motion; hydrostatics; hydrodynamics; intermolecular forces.

220. GENERAL PHYSICS. Sem. 1. SS. Class 3, Lab. 2, cr. 4. (3 IED, S, 5 P, op. 5 A). Must be preceded by MA 111 and 112, or 121 and 122, or 101.

Mechanics, heat, and sound for students not specializing in physics.

221. **GENERAL PHYSICS.** Sem. 2. SS. Class 3, Lab. 2, cr. 4. (4 IED, S, 6 P, op. 6 A). Must be preceded by PHYS 220.

Electricity, light, and modern physics for students not specializing in physics.

251. **HEAT, ELECTRICITY, AND OPTICS.** Class 5, Lab. 2, cr. 5. Must be preceded by PHYS 152.

Heat, kinetic theory, elementary thermodynamics, heat transfer. Electrostatics, current electricity, electromagnetism, magnetic properties of matter; geometrical and physical optics.

343. **MODERN PHYSICS.** Sem. 1 and 2. Class 4, Lab. 2, cr. 4. (5 ENGR, op. S). Must be preceded by PHYS 241 or 251 or 261.

A survey of basic concepts and phenomena in atomic, nuclear, and solid state physics, accompanied by laboratory.

DUAL LEVEL—UNDERGRADUATE AND GRADUATE

504. **PRINCIPLES OF PHYSICS.** SS. Class 3, cr. 3. Prerequisites: College physics and mathematics through calculus.

A review of classical physics, with emphasis on the unfying principles operating in the various domains. Stress will be placed on the operational approach, the conservation principles, and the field theory view of gravitation and electromagnetism. Designed primarily for secondary school teachers. Professor Tendam.

542. **SURVEY OF MODERN PHYSICS I.** Sem. 1. SS. Class 3, cr. 3. Prerequisites: General physics and calculus. Restricted for graduate credit to candidates in education or science teaching.

Elementary particles. Relativity. Quantum theory. Atomic spectra and X-rays. Pauli principle. Wave mechanics. Radiation and statistics.

549. **SURVEY OF MODERN PHYSICS II.** Sem. 2. SS. Class 3, cr. 3. Must be preceded by Physics 542 or equivalent.

Solid state physics; nuclear particles and forces; natural and artificial radioactivity; particle accelerators; nuclear reactions; fission and fusion. Designed primarily for secondary school teachers.

550. **INTRODUCTION TO MODERN PHYSICS.** Sem. 1. Class 3, cr. 3. Should be preceded by at least one junior-level course in each of mathematics and physics, or the equivalent.

556. **INTRODUCTORY NUCLEAR PHYSICS.** Sem. 1 and 2. Class 3, cr. 3. (el.). Must be preceded by PHYS 550 or taken by special arrangement.

Theory of relativity; elementary particles; structure of stable nuclei; radioactivity; interaction of nuclear radiation with matter; nuclear reactions; particle accelerators; nuclear instruments; fission; nuclear reactors cosmic radiation and high-energy physics; mesons; hyperons.

DEPARTMENT OF PSYCHOLOGY

Professor Asher in charge

120. **ELEMENTARY PSYCHOLOGY.** Class 3, cr. 3.

Introduction to the fundamental principles of psychology, covering particularly the topics of personality, intelligence, emotion, attention, perception, learning, memory, and thinking.

210. **FIRST COURSE IN EXPERIMENTAL PSYCHOLOGY.** Sem. 1 and 2. Class 2, Lab. 2, cr. 3. Must be preceded by PSY 120.

An introduction to the use of laboratory methods in the study of sensory and motor functions, emotions, and learning.

235. **CHILD PSYCHOLOGY.** Sem. 1 and 2. Class 3, cr. 3. (3, 4, 5, 6 H, el.). Must be preceded by PSY 120 or its equivalent.

Age-level characteristics and needs of children from birth to the teens in motor control, language, learning, play, etc.; interpersonal relations and other factors affecting children.

340. **GENERAL SOCIAL PSYCHOLOGY.** Class 3, cr. 3. Must be preceded by six hours of psychology or three hours of psychology and three hours of sociology. GS 234 may be included as three hours of sociology. (Same as SOC 340.)

Conditions and consequences of human behavior in social situations, with emphasis upon the mechanism and the process on the bases of which socialization takes place.

350. **ABNORMAL PSYCHOLOGY.** Sem. 1 and 2. SS. Class 3, cr. 3. (el.). Must be preceded by three hours of psychology.

Various forms of mental disorder from the standpoint of their origin, treatment, prevention, social significance, and relation to problems of normal human adjustment.

DUAL LEVEL—UNDERGRADUATE AND GRADUATE

533. **PROBLEMS IN CHILD PSYCHOLOGY.** Sem. 1. SS. Class 3, cr. 3. (el.). Must be preceded by six semester hours of psychology.

Development of the child from birth to adolescence, with special study of such topics as play, sex differences, and learning at different age levels.

534. **PSYCHOLOGY OF ADOLESCENCE.** Sem. 2. Class 3, cr. 3. (el.). Must be preceded by six semester hours of psychology.

Development during the teens, with special reference to general life problems facing youth of these ages, and an investigation into ways and means of helping youth to meet its problems constructively.

537. **MENTAL HYGIENE IN EDUCATION.** Sem. 1 and 2. SS. Class 3, cr. 3. (el.). Must be preceded by PSY 120 and ED 285.

550. **INTRODUCTION TO CLINICAL PSYCHOLOGY.** Sem. 1 and 2. SS. Class 3, cr. 3. (el.). Must be preceded by 12 hours of psychology.

DEPARTMENT OF SOCIOLOGY

Professor M. B. Ogle in charge

100. **INTRODUCTORY SOCIOLOGY.** Sem. 1 and 2. SS. Class 3, cr. 3. (el.). May not be taken for credit by students of junior or senior standing.

A survey course designed to introduce the student to the science of human society. Fundamental concepts, description, and analysis of society, culture, the socialization process, social institutions, and social change. A first course for sociology majors and a possible terminal course for nonmajors.

220. **SOCIAL PROBLEMS.** Sem. 1 and 2. SS. Class 3, cr. 3. (el.). Must be preceded by SOC 100 or GS 234 or equivalent.

Analysis of problem conditions in modern society—family disorganization, racial conflicts, class struggle, mental illness, narcotic addiction, gambling, alcoholism, and others. Social factors involved in the development, continued existence, and amelioration of these conditions.

DUAL LEVEL—UNDERGRADUATE AND GRADUATE

553. **THE SOCIOLOGY OF THE FAMILY.** Sem. 2. Class 3, cr. 3. (el.). (Offered in 1962-63 and alternate years thereafter.) Must be preceded by SOC 100 or SOC 312, or GS 234 or equivalent.

The family as a social institution, featuring its uniformity and variability in historical time and social space. Family institutions in preliterate, ancient, and modern cultures. Particular emphasis upon the development of the family in Western European culture.

SPEECH

Professor Monroe in charge

114. **PRINCIPLES OF SPEECH.*** Sem. 1 and 2. SS. Class 3, cr. 3. (1 or 2 A, PEM 1, 2, 3, 4, 5, 6 ENGR, IED, el.).

UNDERGRADUATE LEVEL
Upper-Division Courses

314. **ADVANCED PUBLIC SPEAKING.** Sem. 1 and 2. SS. Class 3, cr. 3. (el. 4, 5, 6, 7, 8). Must be preceded by SPE 114 or 116.

Development of a marked degree of skill in the composition and delivery of various types of speeches; special emphasis on speeches related to the student's major vocational area.

318. **ARGUMENTATION AND PERSUASION.** Sem. 1. Class 3, cr. 3. (el.). Must be preceded by SPE 114 or 116.

Evidence and forms of reasoning; analysis and synthesis of argument; consideration of the major principles and techniques of persuasion; practice in application of argumentative and persuasive techniques.

325. **THE BUSINESS AND PROFESSIONAL INTERVIEW.** Sem. 1 and 2. SS. Class 3, cr. 3. (el.). Must be preceded by SPE 114 or 116.

Study and practice of methods used in business interviews, emphasing logical and psychological bases of personal persuasion.

DUAL LEVEL—UNDERGRADUATE AND GRADUATE

569. **WORKSHOP IN SPEECH AND HEARING THERAPY.** SS. cr. 1 to 3. May be repeated for credit.

SCHOOL OF INDUSTRIAL MANAGEMENT

Dean Weiler in charge

200. INTRODUCTORY ACCOUNTING. Sem. 1 and 2. SS. Class 3, cr. 3. (Required of undergraduate students in pre-industrial management and industrial economics.)

Introduction to the fundamentals of accounting.

201. COST ACCOUNTING. Sem. 1, 2 and SS. Class 3, cr. 3. Must be preceded by INDM 200 or equivalent.

Nature of cost accounting; job orders, process, and standard cost methods. Preparation and uses of various types of cost reports.

ECONOMICS

210. PRINCIPLES OF ECONOMICS. Sem. 1 and 2. SS. Class 3, cr. 3. (S, A, el. ENGR, P). Credit will be given for only one of ECON 210, 213, 215.

Study of the basic economic institutions, such as business, labor organizations, banks, and government. Analysis of the effects of competition, monopoly, and government on allocation of resources in production and consumption; factors affecting size and growth of national income.

212. PRINCIPLES OF ECONOMICS II. Sem. 1 and 2. SS. Class 3, cr. 3 (el. 4, 5, 6, 7, 8). Must be preceded by ECON 210.

Continuation of ECON 210. Emphasis on more thorough understanding of basic principles and their application to solving economic problems.

ADMINISTRATIVE AND INSTRUCTIONAL STAFF

GEORGE R. AVERITT (1961)........Lecturer in Economics
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B.S., Manchester, 1956; M.S., Michigan State, 1960.

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B.S., Notre Dame, 1937; M.A., 1940.

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B.A., Washington, 1936; M.A., Columbia, 1943; Ed.D., Colorado State, 1953.

THOMAS R. NUNN (1946)..........Associate Professor of General Studies
A.B., Central Mich College of Education, 1935; A.M., Michigan, 1940.

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B.S., Purdue, 1962.

PAUL F. PHIPPS (1962)...Lecturer in English
A.B., Valparaiso, 1949; M.A., North Carolina, 1950; Ph.D., Johns Hopkins, 1961.

ROBERT F. SCHWARZ (1952).....Director of the Purdue-Barker Memorial Center, with the rank of Associate Professor; Assistant Manager of the Northwestern District
A.B., Indiana, 1950; M.S., 1952.

ROBERTA J. H. SWANSON (1962)...Lecturer in Psychology
B.S., Alabama Polytechnic, 1955; M.S., Purdue, 1957.

LAWRENCE T. TANBER (1952).....Lecturer in Mechanical Engineering Technology
A.T.A., Purdue, 1951.

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UNIVERSITY EXTENSION COUNCIL
1962-1963

Ex-Officio Members

C. H. Lawshe, Ph.D.	Dean of University Extension
D. A. Scott, Ph.D.	Associate Dean of University Extension
K. M. Michels, Ph.D.	Assistant Dean of University Extension and Representative of the Graduate School
E. L. Butz, Ph.D.	Dean of Agriculture
H. G. Diesslin, Ph.D.	Associate Dean of Agriculture and Director of Agricultural Extension Services
L. O. Nelson, Ph.D.	Director of Conferences and Continuation Services
F. K. Burrin, Ph.D.	Director of Summer Sessions and Evening Classes
C. L. Larsen, Ph.D.	Director of Indianapolis Campus and Representative of University Centers

Appointed by the President for One Year

G. W. Bergren, M.S.M.E.	Professor of Mechanical Engineering
H. George DeKay, Ph.D.	Professor of Pharmacy
J. Robert Eaton, Ph.D.	Professor of Electrical Engineering
James R. Maris, B.S.	Head of Department of Aviation Technology
Irving A. Morrissett, Ph.D.	Associate Professor of Economics
J. Howard Porsch, M.S.C.E.	Professor of Engineering Graphics

Appointed by the President for Two Years

D. B. Doner, Ph.D.	Associate Professor of English
R. J. Grosh, Ph.D.	Head of the School of Mechanical Engineering
T. D. Hanley, Ph.D.	Professor of Speech
W. E. Martin, Ph.D.	Head of Department of Child Development and Family Life
M. M. Snodgrass, Ph.D.	Associate Professor of Agricultural Economics
H. H. Young, M.S.I. Engr.	Professor of Industrial Engineering

Appointed by the President for Three Years

F. N. Andrews, Ph.D.	Head of the Department of Animal Sciences and Professor of Animal Sciences
Russell Cosper, Ph.D.	Head of the Department of English and Professor of English
W. O. Forster, Ph.D.	Head of the Department of History and Professor of History
Felix Haas, Ph.D.	Head of the Division of Mathematical Sciences and Professor of Mathematics
H. C. Rountree, B.S.I.E.	Head of Department of Engineering Technology
D. H. Walther, Ph.D.	Head of the Department of Modern Languages and Professor of Modern Languages

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